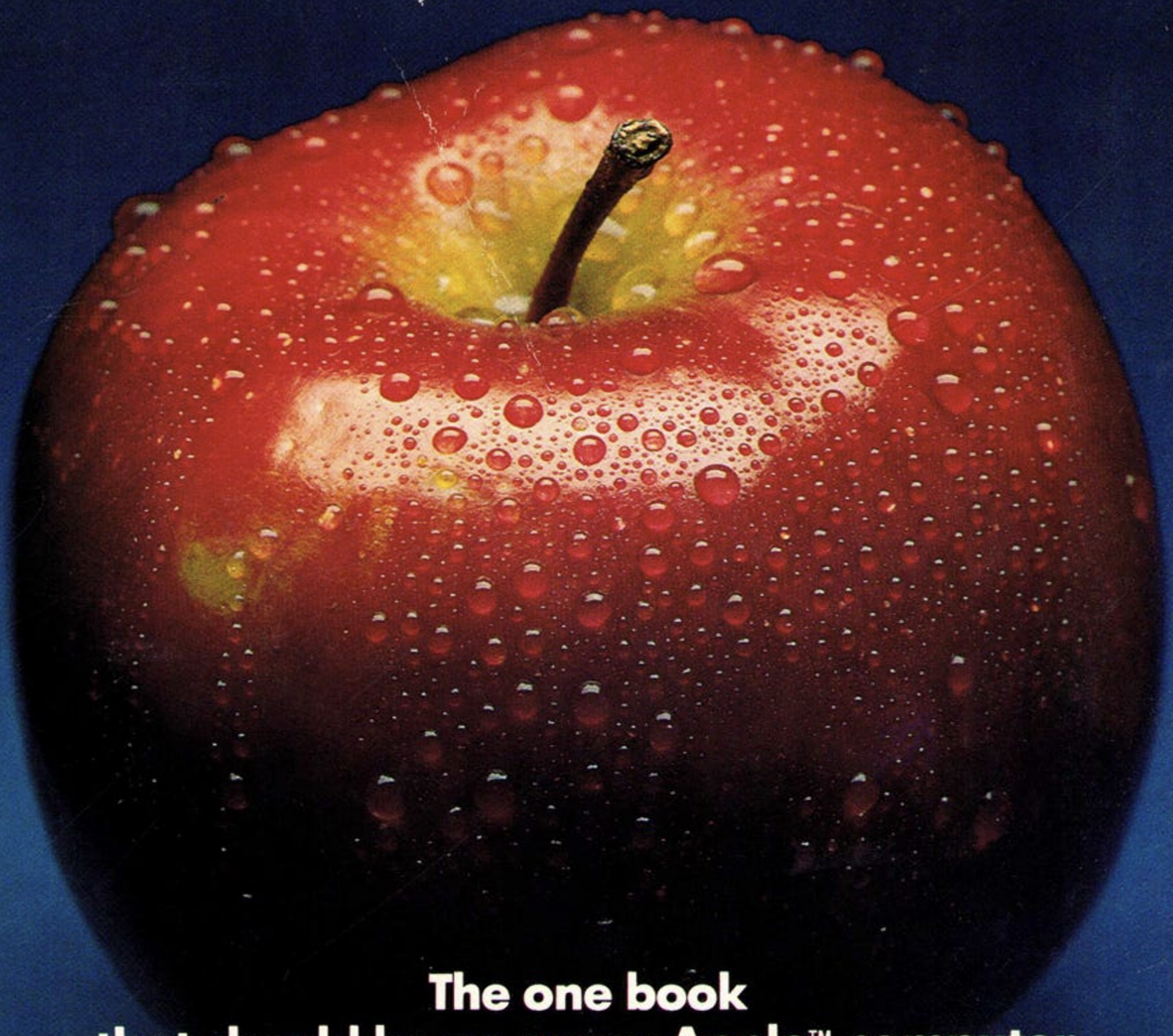
micro COMPUTER books

The Addison-Wesley Book of

APPLE COMPUTER SOFTWARE 1983

Edited by
Jeffrey Stanton, Robert P. Wells, Ph.D.,
and Sandra Rochowansky



The one book that should be on every Apple™ computer owner's shelf

The Addison-Wesley Book of

APPLE COMPUTER SOFTWARE 1983

Edited by
Jeffrey Stanton, Robert P. Wells, Ph.D.,
and Sandra Rochowansky

THE BOOK COMPANY
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1983

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INTRODUCTION

This edition of *The Book of Apple Software 1983* combines material from previous editions (some re-written) and many new articles, reviews, and evaluations of products available for Apple Computers. Judging from the response accorded the first two editions, which immediately sold out, there is a great need for a guide to the hundreds of programs that compete for the Apple owner's dollar. With the introduction of many new add-ons and peripheral units, choices concerning what to purchase become even harder. We therefore dedicate this book to you, the consumer. We hope you will use it as a reference guide, as many dealers do, to assist you in making informed and intelligent decisions when investing in software.

At present, the Apple computer owner is faced with a bewildering selection of software available for a growing variety of applications. On the one hand, this should please you: as the owner of what remains probably the most popular microcomputer in the world, you have a wide and rapidly expanding number of software programs from which to choose. On the other hand, this broad selection presents you with the problem of knowing which is the best program that answers your particular needs. The vast majority of retail computer store salespeople simply do not have the time to adequately review each new piece of software that comes on the market. The problem is compounded if the new program is an extensive or complicated one, such as an accounting package or a word-processing system, or a comprehensive data base management package. This does not mean that store personnel do not want to give you the best service possible; it's just that it is almost an impossible task given this industry's rate of growth. If you purchase software through the mail, the risks that you run without a reliable guide to assist you should be doubly apparent.

Another potential problem area for the consumer is the similarity of software packages. A well stocked computer store may possibly offer five different word-processing programs, four assemblers, a dozen different adventure-type games, mail list and other business programs — the choices seem endless. All of these programs have obvious advantages and disadvantages as well as different prices. You can't possibly try them all out, so how do you select among them? One goal of *The Book* is to minimize if not eliminate the difficulty of picking the software best suited to your needs.

In addition, the opposite problem can present difficulties: not all stores carry a full range of software. If the package you need isn't on the shelf in front of you, you must consult sources such as *The Book* to find out if the program you need exists. Many small and specialty software publishers do not advertise widely, but their products are often reviewed in our pages.

Certain interesting trends noted during 1981 have continued to develop and accelerate through 1982: for example, the "shake out" among retail computer stores. The distribution and sales of microcomputers has definitely become big business, with more and more major corporations seeking to gather in shares of an exploding market. The number of the early stores, those started primarily by engineers and other computer people lacking sufficient business expertise and financial backing, have dwindled sharply. In general, they have been unable to adjust to the rapidly changing market conditions. Typically, the early customers were engineers, programmers, and hobbyists. Today's customer is much more likely to be a businessman or home user, someone without a computer background but who is looking for a tool with which to perform specific functions. As technology advances and competition for your business increases, the price of computer equipment will continue to fall. But initial low cost is by no means the end of the story. Consider carefully your own requirements in terms of service, customer support, and continuing software needs, and patronize those stores who understand the new customers' needs and are able to meet them. It will pay dividends in the long run. We cannot overemphasize the strong need for continuing support once you've made your initial computer purchases.

Since *The Book* is primarily about software, we must at least touch on one of the more perplexing problems confronting the software industry today: piracy, and the industry's major defense, copy-protected disks. The average person has little conception of just how difficult it is to produce a decent program. Even what looks to be a simple game program (never mind complex business programs) can take many weeks or months of coding and testing to produce. Then comes packaging, advertising, and support. All in all, it is a very expensive undertaking, both in terms of time and money invested. But what happens? Many people, not recognizing the copyright laws or caring about the work that went into producing the diskette they purchased, will happily copy the program and give it to their friends, perhaps in exchange for programs they would like. In order to protect themselves, software manufacturers will frequently "copy-protect" their disks, which means, in most cases, that users cannot make copies from the original diskette. This may present the consumer with another problem, because copy-protection prevents you

from making a backup copy of the program and occasionally even increases the risk of disk failure. You may purchase a $30 game or $600 business program from a dealer only to find that the diskette, for some reason, will not work. If the store is unwilling to replace it, your only alternative is to send it to the software publisher for replacement and wait one or two weeks. Or what happens (and this is especially worrisome for business people) if your disk "crashes" or suffers some accident in storage? Must your business grind to a halt while you wait for a replacement? As with many controversies, there are good arguments to be made on both sides of the copy-protection question; and unfortunately, no compromise solution is in sight. But in the meantime, you should take the following steps to protect yourself:

(1) If you purchase a program in a store, insure that the disk "boots" properly *before* leaving.

(2) If the program is copy-protected, ask what the replacement policy is from the publisher should the disk fail after a specified length of time.

(3) If you are buying a business program, deal only with those companies that have some type of policy for providing you with a backup disk should there be a problem.

Lastly, we wish to say once again that we welcome the comments and criticisms of our readers, for we continue to seek better ways to meet your changing needs.

APOLOGY IN ADVANCE

While we have striven to include the majority of known and available Apple software, we realize that there are a number of programs which have not been included. In most cases, omissions are a result of our not being aware of a program's existence or our inability to obtain and review a program in time to meet our press deadlines. We apologize for these omissions, and will try to keep you as current as we can with supplemental issues of *The Book*. We also feel constrained to point out that software vendors seem to change addresses frequently, and that the suggested retail prices of various products likewise change often. The information published here was true to the best of our knowledge at the time we went to press, but is subject to change without notice.

We have made every effort to present fair and objective evaluations of Apple software. But it is appropriate to point out here that neither our reviewers nor the publishers of *The Book of Apple Software* will be held liable for any mistakes, comments, or omissions that have occurred. We welcome comments from our readers, of course; and in future editions we will correct or revise errors which are brought to our attention.

Remember: *The Book* is merely intended as a guide to owners and would-be owners of Apple computers. As a consumer, it is your responsibility to do whatever further investigation you deem necessary before making your software purchases.

A LOOK AHEAD TO 1983

In last year's edition of *The Book of Apple Software*, we commented on the fact that 1982 would see the first substantial challenge to Apple's position as the premier personal computer company. We also felt that IBM would be the company leading the attack. Both predictions came to pass, and with a vengeance.

In 1982, IBM is said to have shipped approximately 200,000 units of their new personal computer compared to Apple's estimated 300,000 Apple IIs. For 1983, we predict that IBM will exceed Apple both in terms of units shipped and dollar volume in personal computer sales.

But we do not feel that Apple Computer Inc. will surrender their industry position without a fight. The question will be whether Apple has sufficient weapons at their disposal to mount a strong counterattack. Apple's strongest attribute is their name. Excellent marketing strategies combined with powerful dealer loyalty gave them that name. Also contributing to their success was the fact that, from the beginning, Apple's policy was to encourage others to build hardware or write software that was compatible with their machine — a policy which, incidentally, has not been followed by a number of other manufacturers, much to their regret. All in all, it can be said without much exaggeration that Apple Computer Inc. "built" the microcomputer industry, and will not soon disappear from the field.

Nevertheless, in an industry that moves as quickly as this one, the past can be rapidly forgotten. There are several cold realities that Apple will have to address soon if they are to remain a major contender. The most obvious one is the fact that the Apple II computer, the mainstay of Apple's business, is approximately 5 years old — still an excellent computer, but it is becoming more and more vulnerable to the competition. Apple, of course, is well aware of this fact. But their proposed replacement, the Super II, originally thought by the industry to be announced during the summer of 1982, has been delayed until the first quarter of 1983. The Super II is expected to feature a built in 80 x 24 display capability with an expanded keyboard (including numeric keypad). It should also allow upper and lower case capability. And, best of all, it is also presumed to be compatible with Apple II software.

Apple also anticipates announcing the release in 1983 of another major addition to the Apple family: their business-oriented, 16-bit computer. Expected to retail somewhere in the area of $8,000, it is apparently receiving favorable reviews from certain independent software houses that are currently working on software for the machine.

1982 also saw changes in Apple's distribution and dealer policy. Because of legal action, most mail order houses have effectively been stopped from offering discounted Apple computers by mail. Perhaps even more significant was the dissolution of the distribution agreement between Apple Inc. and Computerland Corporation, the nation's largest franchise chain of retail computer stores. (Individual Computerland dealers, however, still can and do deal directly with Apple to obtain its products.) This is bound to have some effect on Apple's visibility in the marketplace; and it will be interesting to see what new changes in this area will occur in 1983.

It will also be interesting to see if Apple's new products will appear quickly enough and be good enough to defend their position against all of the other players going after "Number One." To keep things in perspective, though, remember that the personal computer market is much larger now than when Apple began marketing, and getting bigger every day. There is room for several strong contenders. And we foresee no abatement in the proliferation of software available for Apple computers.

CRITERIA

Each program included begins with a listing of basic facts and a summary rating, followed by the review commentary. Because our reviewers were agonizing over the point scale ("Is this feature worth an 86 or an 87?"), we've returned to the familiar A through F grading system:

A	B	C	D	F
(Superior)	(Good)	(Average)	(Poor)	(Unacceptable)

An exception to this is Availability, which uses a 1 to 10 scale, indicating whether a program will be available from few dealers or many (10 # almost all dealers).

GENERAL

These are grading criteria that apply to almost all programs, regardless of category:

Overall Rating: This takes all facets and evaluation criteria of the program into consideration.

Value For Money: Is the purchaser getting what he is paying for? Is it good value compared with similar programs?

Vendor Support: Does the software company back its product? Are they available to answer question? Will they replace a defective program (bad disk or tape)?

Documentation: Does the documentation answer all questions clearly, and is it extensive?

Error Handling: Does the program "crash" during execution? Are there proper error-trapping routines?

Reliability: Does the program consistently do what it's supposed to do?

Note: An * indicates that the tape or disk is not copyable.

ARCADE GAMES

This category refers to those games considered to be of the "shoot-'em-up" or "action" type. Specific criteria for this category include:

Challenge: Does the game challenge the participant, or is it a game one will tire of quickly?

Controllability: How responsive is the game to either keyboard, paddle, or joystick control?

Creativity: Has the author been creative and imaginative, or not?

Game Concept: Is the idea behind the game sound? Does it require strategy and offer a goal?

Game Depth: Does the game have much of a scenario? Does it offer a number of challenging levels?

Skill Involved: Does the game require strategy and skill, or is it based mostly on luck?

Holds Interest: Is this game one you would like to play over and over, or is it one that you will soon lose interest in?

Graphics: Was excellent use made of the computer's graphics capabilities, or not? Are the visual effects pleasing or dull?

ADVENTURE GAMES

These games are those considered to be of the "puzzle," text, or adventure variety. Special criteria for this category includes:

Puzzle Quality: For adventures, how complex are the puzzles or riddles in the game? Does the mapping follow a logical sequence?

Originality: Is the game novel and inventive, or does it smack of conformity in concept and execution?

Vocabulary: For adventure games, how good is the parser, or how well does it understand words and commands that you input?

Text Quality: Are the descriptions imaginative, or bland?

Save/Restore: Does the game have a save-game feature, allowing you to continue later, and how accessible is it?

Difficulty: What is the level of difficulty encountered in this game? Is it challenging, or suited to novice adventure game players?

Graphics and **Holds Interest:** as above.

BUSINESS

As the title suggests, those programs of a "practical" nature apart from educational and utility packages, even if designed for home use and not the office. One specific criterion not described above is:

Ease of Use: Are the screen designs and documentation clear and well laid out, enabling the new user to run the program with a minimum of difficulty?

EDUCATION

Any program which purports to teach or offer instruction. Specific criterion includes:

Educational Value: How effectively does the program teach its subject?

UTILITIES

In general, those programs whose purpose is to enable you to use your computer more effectively. One criterion especially important to this category is:

Usefulness: Does the program offer a good, necessary, or important tool to the user?

MISCELLANEOUS

You will notice that some programs are discussed but not rated. This will occur for one of several reasons:

(A) We received the program too close to the press deadline to thoroughly review it. We felt, however, that the program was of sufficient merit and/or importance to warrant some kind of consideration. Given the time constraints, we tried at least to describe it. A complete review should follow, either in a supplemental issue of *The Book* or a later edition.

(B) Some programs fall into such specialized categories that a reviewer with expertise in that particular area was not immediately available. However, the program appeared to be of sufficient worth to merit some comment.

(C) The Book Company is now a division of a larger organization, Arrays Incorporated, which is engaged in software publishing. We have always provided impartial evaluations of software products, and therefore any programs that could involve a conflict of interest are not rated.

THANKS TO THE REVIEWERS

We must gratefully acknowledge the reviewers who have made the 1983 edition of *The Book of Apple Software* possible. They have labored many hours to share their knowledge and experience with other owners and prospective owners of Apple Computers. Our thanks to:

John Dickey
Kathy Farmer
Mike Farmer
George Lee
Pieter Lechner
Eric Lowhar
Bob Male
Mike Mikus
William T. Mooney
John Mudd
D. William Reichner
Lou Rivas
Sandra Rochowansky
K.S. Sadlier
Mel Samples
David Sanford
Robert Schoenburg
Andrew M. Seybold
Greg Staie
Jeffrey Stanton
Henry Waldman
Raymond L. Watt
Robert P. Wells
Don Worth

We would also like to extend a special thanks to Kim Schuette and Tom Simondi, for reviewing above and beyond the call.

A CALL FOR REVIEWERS

Help! Because software for the Apple computer continues to proliferate at an amazing pace, and the knowledge necessary to pick software wisely from a host of similar programs continues to expand, the need for our review service has never been greater.

We wish to take the opportunity at this time to issue a call for more reviewers. The variety of microcomputer applications is increasing (ranging from farm management to weather science), and we would like to enlist the assistance of Apple-owning experts in different fields. We want to make *The Book* as complete as possible, because frequently the only real notice the public will have of specialty programs will be in *The Book*. But because we provide consumer reports on programs, rather than simple directory listings, we need specialists to handle certain programs.

There are a number of benefits associated with being a reviewer, not the least of which is the possibility of amassing software that ties in to your particular area of interest. If indeed you wish to become a reviewer, please send us a description of your experience, the type of hardware that you own, and indicate your area of interest and expertise. We would also like a sample review (whether we've evaluated the program already or not), to give us an idea of your writing style. Please send the information to:

THE BOOK COMPANY
11223 S. Hindry Avenue
Los Angeles, CA 90045
ATTN: Review Dept.

And please be patient. It will take us a while to deal with all of the correspondence.

ATTENTION: SOFTWARE PUBLISHERS AND AUTHORS

The Book of Apple Software presents you, the producer of software, with a unique opportunity to greatly increase the visibility of your programs. There is no other single source of objective software evaluations for Apple owners like *The Book*. Our sales, surveys, and projection figures indicate that a substantial percentage of Apple owners either own or have consulted *The Book* before making their software purchases. Likewise, a large number of Apple dealers use *The Book* when recommending software for their customers, and as a reference to assist themselves in ordering products for their stores.

The task of locating, acquiring, and then reviewing the increasing number of software programs for the Apple computer is a huge one, and getting more complex each week. We need your help, to keep us informed about new products and enhanced versions of existing programs, and to supply us with copies for evaluation. At the same time, we will help you by providing you with a showplace for you product that is effective, far-reaching, and yet considerably less expensive than any form of advertisement you may be contemplating. Indeed, *The Book* is often the only substantial notice the public may receive of interesting specialized programs. In terms of valuable publicity and increased sales, many companies have found it to their advantage to be included in *The Book*.

What is the cost to you? Relatively little. All we require is two copies of your software for review purposes. Accompanying the software, we also ask that you include a suggested retail price list, information regarding necessary hardware requirements, and the name of a person to contact in case our reviewers have any questions.

Please send your review copies and relevant information to:

The Book Company
11223 S. Hindry Avenue
Los Angeles, CA 90045
ATTN: Review Department

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BUSINESS

At the present time, many if not a majority of so called "personal" computers, like the Apple, are not being sold to the home consumer, which was the intended marketplace, but to the professional or small businessman.

It appears that the long anticipated mass consumer market has not yet materialized. The reasons usually given for this fact are that the general public is still not aware of small computers and needs further education, or that the public is naturally hesitant to adopt new technology, especially technology that may alter their way of living. Both of these reasons are probably correct and though no one doubts that the mass consumer market will appear, it just is not here yet.

In the meantime, the personal computer market is exploding, fueled not by consumers but by professionals and now small businessmen. At first glance, this is somewhat surprising, since until relatively recently there was very little application (of a practical nature) software available. The answer is, the first buyers of personal computers were hobbyists and other professionals who had experience with larger computers, saw the potential of the personal computer, and had the knowledge to write their own programs. Some of these programs were of sufficient general use to be marketable and are now commercially available.

However, though there are now some business-oriented programs currently available (as you will see in the succeeding section), the business software industry as a whole is still in its infancy. There is a reason for this situation. It is very difficult to produce good programs. A good program needs three things (as we mentioned earlier in THE BOOK): an expert programmer, an expert in the particular application for which the program is designed and someone who can view the whole program as an end-user would; that is, making the program error-proofed, easy to follow and making sure that it has adequate documentation. This procedure is time-consuming and difficult, not to mention expensive. Fortunately, some software houses are now making the necessary commitments, in terms of time and money, to produce good quality software. Some is available now, but more, much more, will be available in the near future.

It is not a supposition or a prediction, but a fact, that in order for the small businessman to remain competitive he will have to learn about and use small computers.

MODELING

So many modeling-type programs are currently on the market that a separate section in *The Book* seemed to be necessary. This introduction will attempt to describe what constitutes a modeling program.

Before we get too far into a discussion of what a modeling program should do, let's first discuss what a model is and what it is used for. This may seem elementary, but a firm definition of terms is necessary in order to understand any concept.

Models are a representation of reality. They exist in many forms. Perhaps the most common models are architectural types which show in scaled format what the final construction will look like. Recently, with the advent of high speed computers, a new form of model is appearing – the math model. For a considerable period of time, scientists have been attempting to describe reality using mathematical terms in the form of a description which would predict what is likely to happen in the future, given certain input assumptions. Such modeling attempts met with much frustration until the invention of the high speed computer, since many of these modeling techniques require statistics and repetitive processing when the conditions of the model are changed and the computations are run many times in order to obtain the most optimal result. These types of computational requirements lend themselves to an area in which the computer best excels.

So, given this, we can see that the elements of a computer modeling system are the actual mathematical representation of the system to be modeled and provide some way to manipulate that representation. We now have to investigate what part of this process the Apple computer could best be utilized.

First, let's look at the mathematical representation of reality. If we attempt to model a complex system in any detail at all, we find that the representation very rapidly becomes quite difficult to build, interpret, and has a mathematical construction that is beyond the capability of an eight-bit machine to handle easily. That leads us to having the small computer handle only the simplest of mathematical representations – those that require rather simple and straightforward computations. Fortunately, there is a class of models that fit this category quite well, and has a large market following: financial models. They're simple, straightforward, and the computations are generally not beyond the capability of eight-bit machines.

This judgment is reflected in the marketplace, since most of the modeling programs are directed at financial modeling (either business or personal) and those areas that are somewhat broader in scope which generally center their examples around a financial situation.

The second major consideration is the manipulation of the model. It's here that the computer really excels. Mass storage and data manipulation techniques are quite well developed for the small computer and are constantly being improved. There are many clever programmers who are producing data structures and manipulation techniques that are very appropriate suited for small models.

The next question which must be investigated is in what way the computer can help the user. The same two areas are subject to question.

Can the small computer help in the generation of models? Of course, the simple answer would be yes; however, on consideration, it is also important to ask if it is economically feasible to produce programs of the complexity required. The answer to that is probably no. For this reason, we should go back to the definition of a model: which is "a representation of reality". Reality is different for every person and often each person has to deal with many different applications (or realities). To develop a program that will model each of these different realities in just the way each person desires would require an insight by the programmer on the nature of the application or a computation technique required for the application that defies imagination. The best we may expect for now is a modeling technique that gives the user tools to work with. Perhaps in the future, processing techniques will be developed which will allow the computer to learn in real-time and turn general desires into specific model constructions.

What the user should look for, then, are constructions that will assist in developing the specific type of model that is of interest. For example, if the model type is to be of an engineering system or some other type of scientific application, then look for such techniques as integration plus various statistical constructs. If a financial model is to be developed, then such things as depreciation schedules, net present value, and internal rate of return should be available for use. In short, those computational techniques that are generally difficult to program, but necessary to a great many models that might be developed, should be in any good modeling package.

OK, now how about the program to manipulate the model once it is developed? There are several things that such a program should be able to do and many more that would be beneficial. In the necessary category falls the ability to accept the model and rapidly change it as required. The program should also be able to implement the model calculations and then report the results in a variety of ways. It would be advantageous if the program were able to create graphics and assist in checking the model logic for you. Other nice features would be the ability to edit data and/or model files, use multiple data files with any given model, and create data files from the model runs for later use in other models (or whatever). In short, the model manipulation program must be as flexible as possible in its ability to handle data so that the user may do whatever is necessary to implement the model.

Now, let's investigate some of the ways that a modeling program could be used. First, the user must make a very basic decision – what to model. This is more difficult than it may seem. It's rather easy to want to model something and quite something else to do it. Assumptions that go into the model will have a profound effect on the outcome –

and assumptions will be necessary for just about anything more difficult than 2 + 2 = ?. Keep the requirements simple to begin with.

When you know what the end product is to be, sketch out the calculations that must go into getting to the result. Find out what the last step is that gets you to the single number you want; then find out what step(s) enter into obtaining the variables that apply to that calculation; then back up from that calculation, and so forth until you get to variables that are to be input. If you have kept good notes, you now have (in reverse order) a summary of the model calculations.

Given the results from the last step, go back to pencil and paper and sketch an outline of the type of report you would like to see that includes all of the variables to be entered into the calculations — usually with the variables toward the top, intermediate calculation steps and results below, and the final result at the bottom. You now have the logic of the model on paper along with at least one report format.

NOW TURN ON THE COMPUTER!

That's right, to this point you have not (or should not have) used the computer! Until you know what you want to do in outline form the computer will only get in the way. There is no program yet on the market in the microcomputer field that will really act like a scratch pad — although some are closer than others.

From here on, the way you proceed is largely program-dependent. In general, you would enter the model logic in some form; either on a spreadsheet (like VISICALC) or in a logic file (like most others). Then you would enter data and the program would use the logic of the model to manipulate the data and come up with an answer. Note that this is just *an* answer, not necessarily the right answer or the answer that you want. Everything depends on the logic and assumptions that went into building the model.

Given this, the program now should give you options for output — either in report form or graphics form (or both).

Now comes the fun. Using the model and data already entered,you should be able to do sensitivity analyses by varying one variable at a time to see how the answer changes in response. In this way you can see which of the variables has the most control over the model. Chances are, in the real world, this variable will be the one you have to watch.

That's the essence of model building and use in today's Apple environment. Who knows what the future will bring? Many programs exist which are structured to work in the way described above — most of them oriented toward the financial model. The real differences lie in the versatility of handling the model and data, along with the ease of entry and manipulation of those items. Use the data that results to narrow down your choice and then ask to use the software before making a purchase. You are the one who is going to have to be satisfied.

As a parting caution, remember one important point. Models are only a representation of reality and are only as good as YOUR modeling data and parameters. If you are not familiar with the calculations that go into the type of model you want to create, have someone who is do it for you. Unlike game programs, these system models demand that you know what you are doing going in. There are very few other types of programs where the maxim "garbage in, garbage out" applies more directly

VISICALC 3.3

Company: VisiCorp
Language: Assembly Language
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $250.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A+	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

Let's assume you're in marketing and do financial modeling; or you're a businessman or accountant and need a quick accounting statement or cost analysis study considering the effects of variable interest rates; or you're an engineer who needs to do repetitive formula calculations. If so, then *VisiCalc* is not merely a useful program for you, it's indispensible. This program, which initially won an award as the single piece of software that most influenced the growth of the microcomputer industry, has been described as "*The* program worth buying a computer for."

Briefly, *VisiCalc* is an electronic worksheet. It employs up to 63 columns and 254 rows to work with. You may create any format you wish within these parameters, and perform whatever calculation or manipulation of figures you find desirable. Quite literally, any problem that can be solved by using a calculator or pen and paper can be done by *VisiCalc* better and much, much faster.

Any position on the *VisiCalc* worksheet can be defined as a label, value, or formula. More importantly, any formula can relate to any other positions or combination of positions on the sheet. Whenever any position's value changes, all other items that depend on that value change automatically, without further action on the user's part. For example, say you were doing business forecasting and wanted to increase sales 10% per month. By taking the sales value of the first month at, say, position B1, and simply defining the new month's sales at position C1 as "B1 *1.1," the C1 value for the second month's sales would be instantly calculated. You may carry on projections through the rest of the year, using constant or variable values. Fortunately, *VisiCalc* has a series of commands, such as "Replicate," which enable the user to easily create rows or columns of repetitious values or formulas, even if each calculation is related to the previous formulas in preceding rows or columns.

VisiCalc features a complete set of arithmetic operations (+, −, ×, ÷) and exponentiation; financial functions, such as Net Present Value, Sum, Avg., Min., Max.; and table lookup, plus trigonometric functions. It has added a number of Boolean logic functions for its command structure, such as TRUE, FALSE, NOT, AND, OR, and IF. Additionally, the CHOOSE command allows the selection of a particular element within a list, based on the result of another calculation.

Other commands allow the user to fix titles while scrolling the locations in the table, or split the screen in sections so they can see only the portions of the table that they are currently using. Values can be formatted in dollars and cents, scientific or interger numbers, and flushed right or left. New editing features allow you to edit formulas without bothering to retype them from scratch. And one can easily move the cursor around the screen with the standard keyboard commands.

Files can be saved to a disk for later retrieval. Files can be stored as formulas for the calculations on the worksheet or in Data Interchange Format (DIF) for use with *VisiCalc*-compatible programs or other programs using the DIF format. The program also features full compatibility with all line printers. The system allows commands that will suppress or add line feeds and adjust the column width. One simply decides which section of the worksheet is to be printed, places the cursor at the top left, indicates the bottom right of the appropriate block, then prints. Large worksheets, of course, have to be printed in sections. Either the calculations or the formulas can be sent to the line printer.

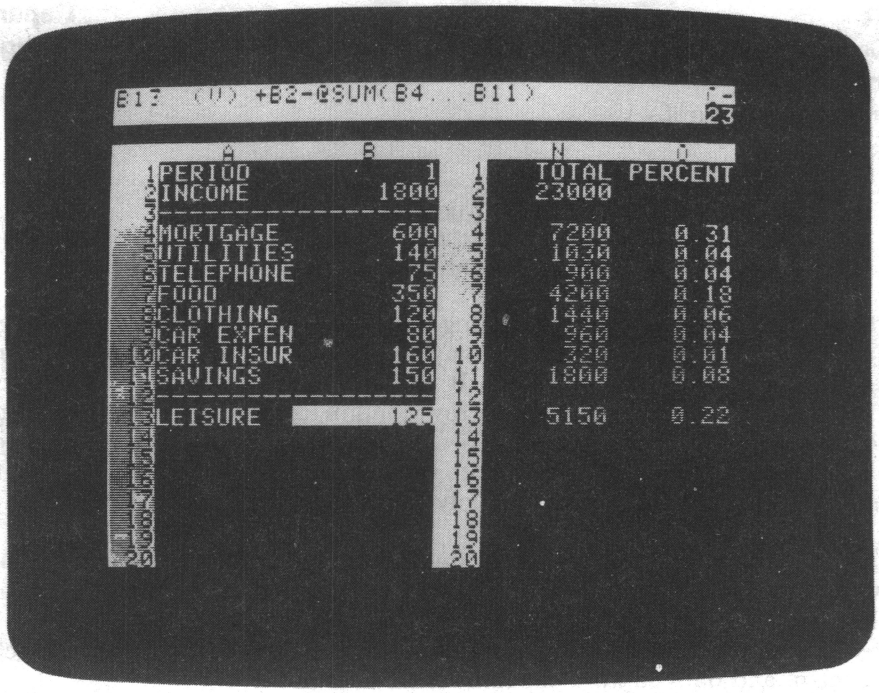
The documentation is excellent. Its manual contains a good tutorial for users who have absolutely no experience in programming. It takes between one and two hours to master. A 4 lesson tutorial offers many practical examples and illustrations. The 144-page command reference section offers very good explanations, and some examples of each command using screen illustrations. Best of all, VisiCorp includes a superbly organized chart of all the commands, and a handy foldout reference chart.

To sum up, *VisiCalc* is a uniquely versatile product applicable to a wide variety of uses and users. VisiCorp has provided retail stores with an excellent demo of *VisiCalc's* capabilities. Check it out. This is a straight "A" classic, and well worth investigating.*

* *Note:* We anticipate that by the time this is published VisiCorp will be selling their *VisiCalc - Advanced Version*. Initially designed for the Apple III, this new version will later be made available for the Apple II+ and for other computers.

The advanced version will add many features missing from *VisiCalc:* changing individual column widths will be possible; multi-spreadsheet consolidation will be a straightforward process; and you will be able to protect sensitive or extra information. On-screen help information will also be available.

We will of course be evaluating the upgraded version of *VisiCalc* when it becomes available.



VISIBLEND

Company: Micro Labs
Language: Applesoft
Hardware Requirements: 48K Apple II/II +

Department: Business
Sugg. Retail: $50.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**D –**	DOCUMENTATION	**F**	RELIABILITY	**D**
EASE OF USE	**D**	VISUAL APPEAL	**F**	USEFULNESS	**D**
VENDOR SUPPORT	**C**	ERROR HANDLING	**F**		

For a time it seemed that every software program which carried a "Visi-" prefix was sure to be useful if not outstanding. *Visiblend*, by Micro Labs, proves to be an unfortunate exception.* *Visiblend* is an add-on program used to combine many VisiCalc files together. The cells in the files are either added or averaged by means of a format file. *Visiblend*, using the format file, merges separate reports into a consolidated file. A 48K Apple II/II +, Applesoft in ROM, DOS 3.3, two disk drives, and VisiCalc are needed to use this program.

The documentation supplied with this program is very sparse, and of little help. Three input example files and one format example were provided in the manual. After trying each example at least 4 times, I found only one item that would total correctly, but the screen reported that the whole consolidation process was successful.

Another problem with the program is that after using VisiCalc to make the format file, the Apple has to be shut off (not reset) to enable the *Visiblend* program to be loaded. After the so-called "successful" consolidation, the machine had to be shut off again to re-load VisiCalc so that the consolidated report could be read on the data disk. It is a cumbersome and time-consuming process. Not recommended.

* This is not, of course, a product of VisiCorp.

VC-LOADER

Company: Micro Decision Systems
Language: Applesoft
Hardware Requirements: Apple II[+)

Department: Business
Sugg. Retail: $95.00
Availability: 5
Disk: Disk*

OVERALL RATING	**B+**	DOCUMENTATION	**D**	RELIABILITY	**A**
EASE OF USE	**A–**	VALUE FOR MONEY	**B–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

VC-Loader converts text files into DIF files for loading into *Visicalc* or other programs designed to use DIF files (such as *Visitrend, Visiplot, or Visifile).* The text file may be created by any means, such as a word processor, or downloading from a data base system like the *Source.* It will also handle Dow Jones type fractions.

In order to use this program, the text file must be in a row/column format. The screen will display the file, and the program allows you to move through it with Visicalc-like commands (right/left arrows and space bar). Once the section to be converted is located, the fields are specified to the program and then the conversion process begins. Individual line lengths may be up to 255 characters, but only 130 of them may be converted by any one run of the program.

The program has an automatic mode for determining fields. For regular data this is handy, hastening setup operations. For the conversion, either row or column DIF files may be specified. A column specification will speed up the processing of large files.

The manual is quite skimpy; it has no assisting examples or figures. In addition, the last section implies that the program has modem control and data capture capabilities. It does not.

This is a handy, general purpose DIF-creating program. I recommend that any file created first be read into *Visicalc* and examined before sending it to other Visi-programs (unless you know exactly what you are doing). This will help avoid serious problems.

VC-MANAGER

Company: Micro-Decision Systems
Language: Applesoft
Hardware Requirements: Apple II[+], Visicalc

Department: Business
Sugg. Retail: $125.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B+**	DOCUMENTATION	**B–**	RELIABILITY	**A**
EASE OF USE	**A**	VALUE FOR MONEY	**B–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

VC-Manager allows you to operate with multiple *Visicalc* files, or two DIF files in order to combine them into a single file. Using *Visicalc* files, the logic is maintained when formulae, instead of values, are present. Using DIF files, calculations are performed on values alone. (The updated version excludes rows, columns, or cells.)

The calculations which merge files may be quite complex to include all of the standard mathematical functions (addition, subtraction, multiplication, division, and exponentiation). Files may be combined with files or with some constant value.

The simplest example of a use for this program is the addition of four quarterly reports in order to obtain the yearly summary report. Other uses are limited only by one's imagination. Up to 15 files may be combined in one pass; and, of course, this combined file may then be combined with others if necessary.

Of course, very interesting results can be obtained if the files operated on are not compatible in form; but even this is acceptable if you know what you are doing. A nice feature is the time estimate provided by the program to do the job requested.

Finally, if you have a great deal of *Visicalc* file combining to do, this could be a very useful program to you.

VISITRAN

Company: Polyglot
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $99.00
Availability: 2
Disk or Tape: Tape

OVERALL RATING	C+	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	C+	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

Visitran presents a potentially useful utility for *Visicalc* owners. *Visitran* (not produced by *Visicorp*) allows its users to create subroutines in Applesoft Basic Programs for their data files, which in turn can be "read" by *Visicalc*.

The current procedure used by *Visicorp* programs is to allow interchange of data via the DIF (Data Interchange Format) routine. Users familiar with DIF may find the *Visitran* method somewhat less time consuming. This is one of its positive points. On the other hand, I would consider neither DIF nor *Visitran* to be "easy," or user friendly.

There are a few further disadvantages to *Visitran*. First, the user must have a good grasp of Applesoft programming beforehand in order to use it. Second, the steps necessary to modify a program are too numerous and complicated. Third, if the program is protected, it cannot be read at all. And fourth, the documentation is only barely adequate.

In conclusion, *Visitran* is a respectable first effort to assist those who would like to have their Applesoft programs communicate with *Visicalc*; but hopefully, improved and easier methods will be forthcoming.

VISI-CAIDS

Company: Data Security Concepts
Language: Applesoft
Hardware Requirements: Apple II or II+

Department: Utilities
Sugg. Retail: $34.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	B–	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C+	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	C	ERROR HANDLING	B	VALUE FOR MONEY	B–

VISI-CAIDS is a series of three programs that manipulate text files created by "Visicalc". The three programs allow you to split labels in order to create a more compact data display. They also allow you to read the formulae that make up a "Visicalc" file and output the results of a "Visicalc" PD (dump all screens) command. The programs work well and performs as advertised. Documentation is brief and offers virtually no examples, so some experimentation may be necessary.

The copy of VISI-CAIDS reviewed came on a 13-sector disk operating under DOS 3.2.1. Your version of "Visicalc" must either be the early 13-sector version or you must go through a rather complex routine of DEMUFFIN-the-text-files procedure, using VISI-CAIDS to modify them, then converting the files to 16 sectors. The program supports one drive only and unfortunately does not take advantage of a second drive if you have one.

VISI-CAIDS is sold on a protected disk. A backup is available from the distributor upon filling out the registration card and remitting $7.50.

The LABEL SPLITTER routine divides label columns into two or more shorter columns of any width. It can also move labels to new columns without moving values in the original column. This is useful in a number of ways. For example, you don't have to enter labels into several columns and go through the trouble of changing every entry when you change column widths. Simply enter the label into one column, allow it to go past the end of the column, and then use LABEL SPLITTER to do the work for you. The entry column width and the optimum column width don't have to be the same. Enter labels and data in a manner that is convenient to you and then modify the format to optimum specifications for printing later.

Be certain to read the instructions carefully when using LABEL SPLITTER. If you do not insert blank columns into the original file for allowing label expansion, you may lose data. Fortunately, the program takes this possibility into account and saves files under a different name. Your original file remains intact.

The FORMULA READER routine prints or displays formulae, labels, and numbers for either one column or all columns along with their coordinates. The presentation is grouped by rows in ascending order. There is an upper limit of 2000 entries when using this feature.

The PD READER routine displays or prints files in a manner similar to "Visicalc's" printing of text files. "Visicalc" does not have to be booted to interface with VISI-CAIDS for this function; thus, this option takes up significantly less room in the computer to display outputs.

CALCSTAR

Department: *Business*
Company: MicroPro International Corp.
Sugg. Retail: $195.00
Language: CP/M
Availability: 7
Hardware Requirements: Apple II/II + with Z-80 card. Two disk drives, printer, and 16K card are helpful.
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A–		

CalcStar is a spreadsheet program similar to *VisiCalc* and *SuperCalc*. It is designed to be compatible with other MicroPro products, such as *WordStar* and *DataStar*. All are similar in appearance when on screen, and have standard cursor control and editing control keys so that any given control key performs a similar (or the same) function in any of the programs. This makes use of this family of programs easier.

As with other spreadsheet programs, *CalcStar* has spreadsheet coordinates far in excess of what can actually be filled in (because of computer memory limits). With a 56K Apple CP/M configuration there is space for approximately 600 entries, with each having a 26 character limit. Digits are carried internally to 12 character accuracy.

Text or numeric entries are recognized by the first character typed. You can also change the type and use the entry line as an immediate mode calculator. Formulas employ the standard operators, with the handy addition of a reference text that may be added to a formula after a backslash ("/") delimiter. This is handy when you are deep within a spreadsheet and do not have the title lines visible. Only one problem was encountered on entry: the back arrow key does not erase text; the CTRL-@ must be used.

Cells within the spreadsheet may be individually formatted to include the numeric precision displayed. A help screen is displayed at all times, but may be deleted on command in order to add five rows to the display. If more help is needed, two screens of help data are available on command. A form of protected data is available with auto entry, allowing access to only the cells with form mode set. In addition, files may be saved with or without password protection. On recall, other forms may be merged into the existing form, and the formulas are automatically adjusted for the new location.

Output may be to disk, the screen, or to a printer. When output is to a disk, provision is made for comma delimited files, so that the data may be entered into programs like *DataStar*. During output to a printer, the program will segment the output of page width. Title lines are allowed, and page breaks may be forced by appropriate symbols entered into the spreadsheet.

The file saved by *CalcStar* is not a standard text file and requires a special program (which is provided) to output the contents. The built in math functions are: SUM, CNT (count), AVG, MAX, MIN, SQRT, LOG, LN, ABS, and EXP. *CalcStar* also has a built-in forecasting function using linear regression (straight line approximation). The command: REGR (<independent variable range>, <start of dependent variable range>) prints the mean of the dependent values in the cursor cell. Following this, three other functions will forecast:

PROJ (ind var): Projects dependent variable best fit.
DEPD (dep var): Projects independent variable best fit.
SLOPE: Gives the slope of the regression line.

Each of these functions operates on the last REGR function computed. Finally, conditional expressions can include the classic form of IF:THEN:ELSE.

CalcStar is a viable entry into the spreadsheet market. It is somewhat limited in memory, but this may be made up with the forecasting functions that are built into this program, but not into the others like it. It deserves your serious consideration, especially if you have other MicroPro products.

PLANNERCALC

Department: Business
Company: Comshare Target Software
Sugg. Retail: $50.00
Language: CP/M
Availability: 3
Hardware Requirements: Apple II/II + with Z-80 Card. Two disk drives, 16K card, and printer helpful.
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A+	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A–		

If you have the hardware to support the CP/M system on the Apple computer, then *PlannerCalc* is a fine bargain among financial modeling programs. It is relatively simple to use, yet quite powerful — especially considering its very low price.

Because *PlannerCalc* is an inexpensive system, some of the options that are available in more advanced systems are missing. These have little effect on most models and reports; but this should be taken into consideration. For a more

detailed discussion of some of these missing parts, see the review on *MasterPlanner*, another Comshare Target program, which is an extension of *PlannerCalc*.

PlannerCalc is unlike *VisiCalc* or the other spreadsheet programs. In order to use the program, you first create a command file which specifies all data, formats, and the logical relations between variables, rows, and columns. The program then compiles this file and executes it to produce a report on the screen. This report may take on the characteristics of a spreadsheet at this time; and may even be manipulated in fixed ways once the calculations are performed. To change the logic you must go back to the original file and make the necessary modifications, then recompile and recalculate the model.

Using *PlannerCalc*, you organize the command file by line number. Each line then appears in the report. With this program it pays to lay out your model on paper before starting to create the command file. It's possible to change lines, but once a variable is given a specific line number, it cannot be changed without much difficulty. Nine lines may be added between any two integer line numbers, but once these are specified, the only way to make any significant changes is to retype the file.

Formatting of the reports is done within the command file. Such things as adding headings to the report, putting on column labels, inserting blank lines for visual separation, and underlining are possible. In addition, global format specifications are defined: for example, every cell could display the dollar sign, the percentage sign, or use commas to set of thousands. Negative numbers may be shown in parentheses if desired.

When writing formulas, each line is given a name, and then any other formula using that line may be referenced either by the line number or by the name. This makes the formulas very easy to read. The standard math operations are all supported along with the following functions: AVE (average), CUM (cumulative value), EXPONENTIATION, GREATER OF X OR Y, GROW BY, INPUT (permits changes at model run time), INTEGER, LESSER OF X OR Y, LN, MAX, MIN, and SUM OF X THRU Y. Conditionals are also supported in a standard IF THEN ELSE format. Referencing may be to some absolute location, or to a leading or lagging period. On display, the program will show split screens. A net present value function is also built into the program.

You may print reports as values or as the command file. This reviewer could not find a way to print the report to disk, so that a formatted report could be included into a report via a word processor. This capability is available on more advanced programs.

The *PlannerCalc* program is an excellent bargain for a user with reasonably straightforward model requirements. As the user's needs grow, the files used by *PlannerCalc* may also be upgraded by *MasterPlanner*. If you have the CP/M hardware, this program deserves your attention.

SENIOR ANALYST

Company: Apple Computer, Inc.
Language: Runtime Pascal
Hardware Requirements: 48K Apple II/II + 16K card; 128K Apple III

Department: Business
Sugg. Retail: $295.00
Availability: 7
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

Because of VisiCalc's overwhelming domination of the "modeling" or "spreadsheet" market, other programs in the same field normally wind up being reviewed in comparison to VisiCalc. *Senior Analyst*, in certain areas, stands up to this comparison very well.

The major advantage of using *Senior Analyst* instead of VisiCalc applies to those areas where a number of different people will need to work on the same model. Unlike VisiCalc, *Senior Analyst* provides the ability to consolidate several different models into one. Another advantage is the fact that the program has a certain number of useful functions built in: for example, net present value, linear regression, depreciation formulas, and compound growth rate. VisiCalc could perform these functions, but only if the user created the necessary formulas. VisiCalc's advantage, on the other hand, is its splendid flexibility, its speed, and its ability to interface to or share information with a large number of other programs. Considering your own applications, it might well make sense to have both of these superior programs.

One advantage of working with the *Senior Analyst* is an ability to define and create the spreadsheet using descriptive names, rather than row and column identifiers which could become confusing or hard to follow. Also, as a financial planner, you will find the ability to include the built-in functions that it supports to be of great advantage.

The other major advantage is its outstanding documentation. Apple provides a fairly complete tutorial, which walks you through the operation of the program starting with very simple examples and working toward spreadsheet models of some complexity. But more, they include a separate reference manual that explains all commands and uses numerous examples.

This reviewer, who confesses to having been confused by VisiCalc-like programs in the past, found this modeling program, while not blindingly fast, very easy to use and effective, and so well deserving of high marks.

TREND-SPOTTER

Company: Software Resources
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $275.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

TREND-SPOTTER, the forecasting tool for management by Software Resources, Inc., is a program which uses a powerful personalized data base with computer graphic data displays combined with statistical information. The program is written for an Apple II with 48K and Applesoft in ROM. It will run with one or two disk drives with or without a printer. A printer with graphics capability is handy if hardcopy of the charts is desired. The program consists of one disk with two main programs in it. A second disk (supplied by the user) is needed for the data. The program will boot in DOS 3.3 and the data disk must be initialized in DOS 3.3, also. When the disk is booted the program looks to see if one or two disk drives is present. If only one is found, then the initialized data disk has to be put into drive one when prompted to do so by the program.

The two programs are called DATABASE and DISPLAY. The database is used to enter the raw data and store it on the data disk. This data can be edited and modified and also updated on a regular basis. Many different types of data can be stored in a monthly, quarterly, yearly, general time-series input which is data that is expressed in terms of an amount that changes with time. All types of business data can be projected for the future if the present and past data are input into the data tables. The main part of the program is the "DISPLAY", which is really the heart of the TREND-SPOTTER. This provides the means of getting the information from the data files and presents it on the screen in a very large variety of graphic formats which can be changed by the statistical programs in the "display" program. The display portion is command-driven in plain English language.

The documentation which comes with the program is very extensive and takes the user step by step through every phase of data input to graphing in every available form and changing formats, mathematical calculations, forecasting, saving to disk, and many others. The Database menu consists of the following:

1. UPDATE FILE (& STATS)
2. CREATE A NEW FILE
3. EDIT AN OLD FILE
4. DELETE AN OLD FILE
5. HARDCOPY FILE CONTENTS
6. DIRECTORY OF FILES
7. GO TO DISPLAY PROGRAM
8. SAVE DIF FILE
9. LOAD DIF FILE

The DISPLAY program is driven by the following commands, which are called Graphing commands:

BARGRAPH	LINEGRAPH	SCATTERGRAPH
AREAGRAPH	LBARGRAPH	

Graph control commands:

CLEAR	NEW	COLOR
HIGH	LOW	HORIZONTAL
STARTING DATE	TITLE	UNITS TITLE
MARKERS		

Statistical commands:

SMOOTH	MOVING	TREND
ARITHMETIC	CONSTANT	BASELINE
INFLATION	DIFFERENTIATE	SUMMATION
LEAD	LAG	PERIOD

Miscellaneous commands:

LOAD	SAVE

All these commands are input only by typing the first three letters of each command, as that is what the computer recognizes.

The graphic capabilities of this program are easy to use and can be varied in many different ways — Bar graphs, Side by side graphs, Line graphs, Scatter graphs, Area graphs and any combination of any of the graphs.

This is a very comprehensive and excellent program for many uses such as business forecasting, plotting sales trends, stock markets trends, moving averages and many other features too numerous to mention. Two additional features included are the ability to interface TREND-SPOTTER to "Visicalc" through the database program and the command which permits direct printing of a graph on a Silentype printer from the display program as the module accesses the Silentype automatically.

TARGET PLANNER

Company: Advanced Management Strategies, Inc.
Language: CP/M
Hardware Requirements: Apple II or II + with two disc drives (two required). 16K card and printer are useful. 80 column card not required.

Department: Business
Sugg. Retail: $225
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	B+
EASE OF USE	C+	VALUE FOR MONEY	B–	ERROR HANDLING	B+
VENDOR SUPPORT	B	VISUAL APPEAL	B		

TARGET PLANNER falls into the category of business planning programs like "Desktop Plan" and "Visicalc". Like the others, the program takes data and formulas and combines these together according to set rules to obtain an output. The planner may then change the input parameters and recalculate the model to observe changes that may take place.

Of the planning programs, TARGET PLANNER compares most closely with "Desktop/Plan-II" (see review elsewhere). The two programs are very similar in execution. Differences lie in the ease with which certain operations may be performed. The major difference lies in data entry and speed of execution. In general, "Desktop/Plan-II" has the better data entry format since data is entered directly into the planning form. With TARGET PLANNER, you must create a program with your formulae and data entered in the correct locations. At times, this program will become rather complicated; identifying a particular piece of data in the midst of the program may be difficult, especially if you are looking to change one number in the middle of a string of the same numbers.

Where TARGET PLANNER outshines "Desktop/Plan-II" is in the entering of calculation rules. Because you actually write a program, the formulae and all connecting logic is laid out before you for easy modification. This is of particular value when you have rather complicated formulae involving logic (», «, »=, «=, etc.). With "Desktop/Plan-II" you have to alter the program itself to obtain these types of logical operations; with TARGET PLANNER, you only have to insert them into the flow of the program that you have created to perform the necessary calculations. The programs that are necessary are not difficult to create, with step-by-step instructions which are included with TARGET PLANNER.

The documentation supplied is quite complete although at times you have to reread sections to completely understand it. Your best bet is to follow along with the computer at your side and actually do the examples as they are listed to get a feel for the program. Be somewhat careful of the examples, however; some have typos in them that are relatively easy to spot, but could lead you astray if followed to the letter.

TARGET PLANNER has the unusual hardware feature of requiring two disk drives. It will not run with just one. The program also has a quirk that is peculiar to the Apple II configuration — it only displays 40 characters on the screen at any given time, even with an 80-column board. It should not be difficult to query the system or the user to see if an 80-column board is in place and expand the display to fit.

It is possible to change the basic configuration of the model you create within limits. Columns may be added to or deleted from the end of the model only. Rows may be added or deleted anywhere in the model.

When creating the model, you have the capability of switching the display from the program you are creating to a spreadsheet showing the results of what you are doing (only the format is shown; calculations come later). This is useful; however, be advised that the part of the model being displayed on one screen may not correspond with the spreadsheet you will see on the other screen as you flip back and forth. Some cursor movement may have to be input to line them up. This is tedious and should be fixed.

Some care must be exercised in the use of TARGET PLANNER for large numbers. The program performs calculations using up to seven significant digits only. It is not really meant for engineering calculations and models, only financial or related models. Note also that when using conditional statements in your program, conditions which appear true may sometimes fail. This is due to rounding and should be taken into consideration if one is dealing with very small numbers.

Both TARGET PLANNER and "Desktop/Planner-II" are similar in execution. One should consider carefully both before making a choice. It is obvious that the author of the TARGET PLANNER recognized that his program was similar to both "Desktop Plan" and "Visicalc", since one of the sample models presented in the rear of the manual is a project analysis for Busytalc - a division of Impersonal Products.

SUPERCALC

Company: Sorcim
Language: CP/M
Hardware Requirements: Apple II/II + with Z-80 card. Two disk drives, 16K card, and printer helpful.

Department: Business
Sugg. Retail: $295.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

It's been said many times in print (and may not be a fair comparison), but *SuperCalc* is considered to be the *VisiCalc* of CP/M. Most reviews of *SuperCalc* turn out to be a comparison between the two programs, and because of their similarities, this is often unavoidable.

SuperCalc is a spreadsheet program in which entries are made into a matrix. Each section of the matrix can be linked by formula to any other section. In addition, text may be entered into and formatted in any cell. The cursor control is through use of a control diamond, or by use of the left and right arrows and space bar (like *VisiCalc*). Within each cell, formulas may consist of numbers, other cell references, or functions. Numbers up to 16 characters are supported. Text length is limited to 116 characters per cell, and formulas are similarly limited to 116 characters. Numbers too large to fit in a cell will be displayed in scientific notation.

Formulas are formed using standard operators and the following arithmetic functions are supported: SUM, COUNT, AVERAGE, MIN, MAX, INT, and ABS. In addition, some trigonometry functions are supported: SIN, COS, TAN, ASIN, ATAN, EXP, SQRT, LN, LOG10, and PI, IF, OR, AND, and NOT. Conditional expressions may, also be formed. Finally, ERROR, NA, LOOKUP, and NPV functions are supported.

The format commands in *SuperCalc* are somewhat more extensive than in *VisiCalc*. Individual column widths may be changed, and if text is entered in a cell with blank entries to the right of it, the text will "spill over" into those cells and remain visible until the cells are filled. The border, which shows row and column locations, may appear on the screen when the spreadsheet is printed. This is especially handy for proofing the spreadsheet. Printing of the sheet may include numbers or formulas, again making proofing easier.

SuperCalc supports protected cells, so you may create spreadsheets for the novice and be a bit more certain that he/she won't have any trouble using them. Help messages are always available on demand through use of the "?" key. The output command prints or lists the contents of the file, or reproduces all or part of the display. Dump is to the printer, the console, or to a disk for transfer and use in other programs. A Data Interchange Format (DIF) is not presently available for *SuperCalc*, but is expected shortly and may be on the market by the time this is published. Horizontal or vertical windows, either synchronized or unsynchronized, are supported. The spreadsheet may also have horizontal or vertical titles, or both may be made titles.

SuperCalc is an excellent spreadsheet program operating in the CP/M environment. It is generally available for many computers, so applications software is easy to obtain. Commercial models are available, and published *VisiCalc* models are easy to reformat for *SuperCalc*. The program's response time is slightly slower than *VisiCalc*, but its increased capability and extra features justify that. The program will not necessarily justify the purchase of the hardware necessary to support CP/M; but if you have it, consider *SuperCalc* for your spreadsheet needs.

PROFITPLAN

Company: Chang Labs
Language: CP/M
Hardware Requirements: Apple II/II + with 16K card, Z-80 card, and two disk drives. Printer helpful.

Department: Business
Sugg. Retail: $195.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	C+	VISUAL APPEAL	A–		

ProfitPlan is a semi-spreadsheet system running under the CP/M operating system. The term "semi-spreadsheet" is used here because, unlike the *VisiCalc* and *SuperCalc* spreadsheets, you may not enter text at any location in *ProfitPlan's* sheet. Text is only allowed along the left edge of the sheet (although some titling is allowed by the report generator).

Data entry is straightforward and rather easy. All interactions with the program are through a series of number commands. The right side of the screen displays the 72 or so commands (not all at once, of course). These help-prompts are divided into sections which cover formatting, data entry, math operations, and utility commands. If the title of a command is not enough, there is a further help command that explains any command's usage.

The dimensions of the table are set by the user. Each table may contain approximately 1,000 entries. The portion of the matrix that is displayed is also controlled by the user. Calculation order is commanded, and may be set to row or column only, or row/column, column/row.

Rows and columns may be specified independently as to format, type of data, and size (rows only). Insertion and deletion of rows and columns is possible. These commands are used in setting up the model. Other commands are used within the model to specify actions which take place during model execution. Unlike the format commands, these formulas and instructions become a part of the model, executed each time the model is exercised.

Formulas that are entered into the model are available for an entire row or column, or individual cells in the spreadsheet. Math commands allow adding/subtracting two rows/columns, multiplying/dividing rows or columns, negating, and inversing (1/row, column). Making an integer from a decimal or rounding is allowed. There is a cumulate command, used for ending balance calculations as well as absolute value. Math with a constant is allowed. There is a form of conditional as well in which a floor, or ceiling is set that, if violated, fixes the result at this floor or ceiling.

Models may be saved to, or retrieved from disk storage. Output on printing is to the printer or to a disk file. Formatting of the output is allowed and titles may be added on printing.

ProfitPlan is a useful combination of a classic spreadsheet and the compiler type of model-building programs. It is most useful in financial applications in which results fall most naturally into a report where descriptions are found on the left margin, and the various rows and columns are combined in a rather straightforward manner.

MASTERPLANNER

Company: Comshare Target, Inc.
Language: CP/M
Hardware Requirements: Apple II/II + with Z-80 card and two disk drives. Printer and 16K card helpful.

Department: Business
Sugg. Retail: $325.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**A**	DOCUMENTATION	**B+**	RELIABILITY	**A**
EASE OF USE	**B**	VALUE FOR MONEY	**A–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**B–**	VISUAL APPEAL	**A**		

The *MasterPlanner* program is the deluxe version of the *PlannerCalc* program reviewed elsewhere in this book. Both are by Comshare Target and use files which may be interchanged. This allows you to start with the inexpensive *PlannerCalc* version and then, when your requirements increase, you may move up to *MasterPlanner*.

The general structure of the Comshare Target programs is outlined in the *PlannerCalc* review. In general terms, *MasterPlanner* offers many small improvements which make the program a great deal more flexible. For example, in *PlannerCalc* you are not able to skip lines when printing a report. With *MasterPlanner*, you are able to skip lines which may be necessary to the calculations, but would add little or nothing to the report. *MasterPlanner* has the following limits (the number indicates the number of characters): heading = 240, column label = 12, line label = 12, model name = 8 (standard CP/M), line length = 240, cell width = 30, number of lines = 5,000. This latter entry number may vary with your system size.

All of the functions found within *PlannerCalc* are also found in *MasterPlanner*, including all forms of conditionals. Absolute and relative column and line referencing are included, so leads and lags may be easily calculated. The horizontal and vertical screen splits are supported, as well as a new function for quadrant splits. History columns may also be added to the model. These enter into the lead/lag calculations. For repeated calculations of the model, there is a command called WHATIF. After performing the basic model calculations, *MasterPlanner* will recalculate based on the "what if" data supplied.

There are several added features in the file storage module of *MasterPlanner*. The program allows you to save only parts of a model. This is useful in cases where parts of one model may be of use in one or more future models; or where portions of a model are to be created by different people and then combined into one larger model. After calculation, you may output the data in any model to a disk file for later use.

To use these functions, there is also a consolidate function where two or more models may be combined into one larger model. The user must exercise certain cautions when consolidating models, but this could be a very useful function.

MasterPlanner is a powerful extension of the smaller *PlannerCalc* program. Its best feature is the added formatting capability, coupled with the ability to divest and consolidate models or sections of models. Few actual financial functions have been added. This would be the one area where improvements might be made.

Try *PlannerCalc* first. If you like it, consider moving up to *MasterPlanner*.

After entering your model logic, you compile the program using the Pascal compiler. After several iterations through the editor and compiler to root out and correct errors, your compiled model will hopefully run. At this point, you now have several options: display the model, put a new caption on the report, print a report, plot on the printer a graph or histogram of a row, change data and rerun (play "what if..."), do a sensitivity analysis, run the model backward to arrive at some target value in some defined position, perform an investment analysis, load and consolidate a matrix to a file, and rerun the model base case. This latter is an option to get you back to the starting position after using some of the options which change data.

The first of the several options are obvious in their application. The sensitivity analysis allows the model to repeat runs while one data row is varied systematically. Only one row is allowed to be changed and only one row is reported; however, the clever programmer can get around these shortcomings. In the first case, simply rerun the sensitivity analysis several times, reporting on different rows; in the second case, set up a data row as a multiplier set initially to 1.0 and simply multiply all rows to be changed by that row. The sensitivity analysis would then make changes to the multiplier row, forcing changes to all of the other rows.

The backward running option allows the contents of one row in the model to be changed in order to determine what values in that row will give a particular value in some target cell. The investment analysis option allows the user to find the internal rate of return (IRR) for a particular row in the matrix. Finally, the load/consolidate matrix to file option allows writing the matrix to disk or, alternatively, reading a matrix from disk and then combining it with your current model. If done carefully, different sized matrices may be consolidated as well as portions of matricies. Totals may be accumulated. The consolidation process is said to be able to be controlled by a model in order to define different types of consolidations within one model.

Another program available as part of the MICROFINESSE package is a graphics option. You may run the graphics program as a stand-alone program or with the model analysis function; both text and graphics are available in several color combinations. In addition, slide shows of up to 16 slides per disk may be created and run forward or backward, singly or automatically at some specified interval. Graph types include line graphs, histograms, pie charts, or straight text.

The graphs are of excellent quality although the amount and type of text allowed on other than the text screens is quite limited. The Y-axis may only have one symbol associated with it and the X-axis is limited to months, quarters, or specified integers. One title line is centered at the top and is limited to 20 characters. On graphs, you are limited to 24 values per chart.

You should evaluate and consider this program for your needs if you require flexible modeling with useful options at run time, but *only if you know how to program in Pascal.*

MICRO DSS/F [Decision Support System/Finance]

Department: Business
Company: Addison-Wesley Publishing Co.
Sugg. Retail: $1,500.
Language: Apple Pascal
Availability: 3
Hardware Requirements: Apple II or II + with Pascal Language System. Two disks are required.
Disk or Tape: Disk with special hardware protection

OVERALL RATING	B	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

The DSS/F is a complete financial planning package that was originally released overseas. DSS/F started as "Rusty's Computing System", named after its programmer, Mr. Rusty Luhring. When the program was released in the United States, it became MICRO DSS/F for Microcomputer Decision Support System/Financial. The name implies that there will be planning modules in the future for other areas (the manual points out that these will be in the areas of project management, personnel, and forecasting).

The first feature that strikes you about the program is its unique protection system. You are free to copy the software as many times as you want for backup purposes, but you will only be able to run that software on one particular machine. With the program, you are provided a slide changer remote control mechanism with a 16 pin plug on the end of the cable. This outfit must plug into the game socket in the Apple computer. The device serves two purposes: (1) it changes "slides" during the slide show feature and (2) it has an embedded ROM in the slotted end that contains the protection device. Periodically, the program checks for the presence of this ROM and its accuracy. If the ROM is absent, the program will abort. This type of hardware protection would appear to be very difficult to duplicate (and more costly); thus, you might expect to see it more often in the future.

The program is written using the Apple Pascal language system; therefore, you must have that system in order to make it work. Two disk drives are mandatory when running this program; having three would not hurt. An 80-column board and printer capable of printing 132 columns are also helpful for taking full advantage of the program features.

The DSS/F program is a financial planning package á la "Visicalc", "Target Planner", and "Desktop-Plan/II". It is primarily a combination of the latter two, with extended capability that directly applies to the business situation. It is these add-ons that make the program much more useful (and expensive).

MICROFINESSE

Company: Osborne/McGraw-Hill
Language: Apple Pascal
Hardware Requirements: Apple II or II + with 2 discs; language or 16K card; Apple Pascal operating system; printer helpful; and MicroFinesse Proprietary Software Protection Device.

Department: Business
Sugg. Retail: $495
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	N/A		

MICROFINESSE is a financial modeling program designed to run on the Apple II under the Pascal operating system. It has many features and is aimed directly at the DSS/F program, currently recognized as the most versatile of the Apple II financial modeling programs. In many ways it equals or surpasses the DSS/F program; however, it is severely flawed in two areas: by the requirement that the user *completely understand* both the Pascal operating system and language, and by the very poor documentation.

The manual is poorly-written, in that it does not explain what is happening during phases of the program. Because of this and the many errors in the manual, the user must have detailed knowledge of Pascal in order to determine the correct processing procedures and take the appropriate steps to fix any problems.

When creating a model logic file, you are essentially writing a Pascal program (which must be formatted correctly) with all the proper syntax that Pascal requires. Of course, the positive aspect of this is that you are able to take advantage of all Pascal features, including creation of procedures, iterative statement types, etc.; but you must understand how to do that.

Given that you are able to work through the manual and develop a test program in order to learn the programming techniques and learn program operation, what does it offer? Actually, quite a bit; and the flexibility allowed by having to write your logic file in Pascal offsets the flaws *once you learn how*.

The largest model matrix allowed by the program is 5000 cells in some combination of up to the maximum of 250 rows of 40 columns. Once you set up the matrix size, you have the option of changing some basic report parameters, such as column width, number of periods, printer linefeed, etc. The names file is the next step in building the model. This is where each row of the matrix is properly identified, or existing rows optionally edited. Row names are allowed to contain up to 20 characters, with an abbreviation specified for the model logic file. Other attributes of the row are then set up at this time.

Once the rows are specified, you are free to enter basic data for those rows designated as data rows. One user feature that could have been added here is an option to have the computer automatically extract all data rows from the model for you to fill in. As designed, the user must specify which rows to fill in, even though they are coded when the row name file is created. The options for data entry include individual values; linear growth by a percentage; compound growth; arithmetic interpolation; geometric interpolation; equal allocation; and pro rata allocation based on another row. Once data are input, you may check them and edit each entry, followed by saving the file. Reading data from a user or other program created file is not allowed at this point.

The report file is next created. Up to 15 report files may be resident on disc at any given time. Each report may have up to three choices or variations on the basic report format, meaning that up to 45 individual report formats are available to the user on disc. The user specifies the row layout and format. Totals and subtotals calculated for the columns are supported, as are sums across columns. Blank columns or rows for formatting are allowed. Row titles may be suppressed or added in front of any column in the report. Row numbers may be suppressed.

The heart of the model is now created: the logic file. You are allowed to use either a row/numerical designation or the short form of the row name you created when the rows were identified. Using these, you write a Pascal program which defines the relations between the names to be used at run time. All standard arithmetic and relational operators are supported in the program. In addition, MICROFINESSE has several built in functions. These are:

ALLOWANCES	Accumulated tax allowances
DEPRECIATION	Depreciation (straight-line or declining balance)
FSROW	Forwards value from an input row
GETNAMEVAL	Gets a value from the user at run time
GETVAL	Gets a value from the user between set limits
NPROFAFTAX	Calculates net profit after tax
NPV	Calculates cash flow net present value
PNBV	Calculates net book value of assets
PSROW	Obtains value one period prior to the current period
RROUND	Rounds up, down, or to nearest unit
SUMM	Adds any number of consecutive rows
TAXPAID	Calculates tax paid accounting for tax lag
VAL	Call for any element previously calculated
SETVAL	Establishes a procedure to set values

When using this program, you are required to create a model and then write a "program" that describes that model. The program describes the logic of the model, while relating each variable or constant in the model to all of the others much like the other planning programs. You are required to do all the work, but that also gives you the required flexibility to do whatever you want.

Once the logic file is checked-out and compiled, a data file is created and validated, after which calculations may be performed. All of these steps take place relatively rapidly once the logic and data files are produced. At this point, you have several options. You may view the data on the screen in essentially any format you want. While in the display mode, you may change input data and then perform "what if" exercises. As many changes as you desire can be accommodated, with the results displayed on the screen.

You may also output to the printer. All you have to do is generate a report format file and run the program with the file as output. "What if" cases are performed as easy as changing the data file and rerunning the calculations. Several format files and data files may reside concurrently on disk for ease of changing either the logic, the data, or the output format. There is also an option for "quick printing" results without the need for creating a report format. This allows you to "draft" your model and then format it exactly the way you want it with the report format. This is a time-saver when building a model for the first time.

Graphics are also included by the planning package. Pie charts, bar charts, stacked bar charts, and line drawings are supported. Any of these may be displayed directly from a save computation file or programmed via output file specifications. These graphs and others you may create by hand may be saved to disk as pictures that may be recalled sequentially in the form of a slide show — rather effective for business presentations, since either text or graphics (or both) may be located on a slide. Seventeen pictures are allowed per disk. Display is advanced either forward or backward (just like a slide projector) via the remote control that is attached to the game port. The only problem that this reviewer had with this feature was an inability to stop the show! The instructions provided said to use the "ESC" key, but that did nothing.

Up to this point (with the exception of the slide show), the program would seem to do the same things as some combination of "Desktop-Plan/II" and "Target Planner". Thus, what are the enhancements?

Enhancements include the use of financial functions among the stable of functions that can be called upon in the logic. There are several: discounted cash flow (involving net present value, internal rate of return, and payback time); depreciation (involving straight-line, declining balance, or sum of the years' digits); loan amortization (including interest paid per period, principal paid, remaining balance, and total payment); and tax calculations (to include tax loss carry forward and lookup table for finding the appropriate bracket and rate). The net present value computations will discount a row of numbers at a constant rate or at rates you specify to arrive at the NPV. A perpetual cash flow stream is also supported, as are calculations that give the NPV of a given stream of values for several streams of discount rates. The results of these multiple calculations may then be used to make financial decisions by using greater than, equal, or less than comparisons with some decision variable.

Internal rate of return is computed in a similar fashion. Either a given cash flow will be used or the function can assume an infinite cash flow. The payback function computes the payback period for a cash flow stream. No payback is indicated.

The depreciation function allows either straight-line or declining-balance depreciation. Residual value may be specified and the half-year convention may be taken into account. You also have the option of switching over to straight-line or sum of years' when declining balance crosses over. If several dollar amounts must be depreciated, starting in multiple periods, the total depreciation is returned. If you want to use the sum of the years' digits depreciation, that capability is also provided in function form.

Four functions are provided to perform the loan amortization function: interest, principal, balance, and payment. Each of these performs the necessary calculations (given the input data), producing the data for the report as you specify.

The tax loss carry-forward function computes the amount of loss fowarded year by year for use which can be applied to the profit and loss figures as displayed in a row on the screen.

When building the models, all the standard arithmetic functions are supported. In addition, you are able to shift numbers right or left for moving the calculation into another period. You may also allocate annual figures across months. Accumulation of value is supported, as well as total values.

The program will handle both simultaneous equations and matrix operations. You must identify these situations to the program; simultaneous equations are not automatically detected. The matrix operations include addition, subtraction, multiplication, and division and operate between the work area and a file. Care must be taken to make certain that there are the same number of elements (rows and columns) in the file as there are in the work area.

In addition to the standard report features, the DSS/F program supports automatic consolidation wherein elements of a financial picture may be reported individually and then combined into a composite picture. Selected rows and columns retrieved from a report are available for "quick looks" during "what-if" gaming. An interesting addition to the report generation feature is the ability to swap rows for columns and vice versa.

At this point, you might be telling yourself that all this sounds good, at which point you may ask if the system is worth the $1,500 cost. The answer to that question depends upon the use to which you will put the package. If all you want to do is plan the household budget, you probably won't want this program, unless you have a desire to own an expensive toy. If you have a serious application for financial modeling, then this program could well pay for itself in a rather short time. As a comparison, consider the use of MODEL1 on the "Source" in non-prime time hours (truly a conservative comparison). Assuming the conservative figure of 15 hours per week at the current connect time rate

of $4.25 per hour, the $1,500 investment will have been recovered in just under six months (24 weeks). At the prime time rate, recovery is quite a bit shorter.

The DSS/F manual is sufficient to run the program. There are not too many examples, but the commands and how to use them are adequately described. The program took some time to learn; however, once learned, it was fairly easy to use.

The DSS/F is an excellent program. It has been field-tested for a couple of years now before being released to the public. If you have a need for a sophisticated financial planning package, DSS/F is a good choice.

DESKTOP/PLAN-II

Company: Visicorp
Language: Applesoft
Hardware Requirements: Apple II or II + with 32K min. At least one disk. Printer recommended. 16 sector disc.

Department: Business
Sugg. Retail: $199
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**A –**	DOCUMENTATION	**B +**	RELIABILITY	**A**
EASE OF USE	**B +**	VALUE FOR MONEY	**A**	ERROR HANDLING	**A**
VENDOR SUPPORT	**A –**	VISUAL APPEAL	**B +**		

DESKTOP/PLAN-II is a significant improvement over the original version. While it was quite useful for planning purposes, the original version was difficult and time-consuming to use. Each entry took quite a bit of time and the entry system was prone to potential human error.

DESKTOP/PLAN-II eliminates many of these deficiencies with a menu-driven system that is quite complete and easy to use. As just one example, in the original system, values were entered into each row/column intersection by first specifying the row number and then the column number. Finally, you had to type END to signify that you wanted a new row. In this update, you are presented with a screen with blocks of data. You are able, with simple keystrokes, to move the cursor through the entry format and enter data wherever you want. One more simple keystroke and you have completed the entry routine. The beauty of this is your ability to see not only what you are entering, but several rows and columns around what you are entering. This helps greatly in eliminating the potential for human error.

The same type of display is available to the user following computations with DESKTOP/PLAN-II. Your printer is no longer needed to read the reports (although a printed report is still the main output desired by most who would use this program). The key is that now you can observe the results to see if they are reasonable before committing then to paper. If not, a few changed entries later you can recompute the results and see them again.

But that's not all. In addition to the much improved data entry scheme, you get new functions for the added $100. Now it is possible to convert a limited number of "Visicalc" files to work with DESKTOP/PLAN-II. In order to do so, however, you must follow several explict rules. If you do not, the transfer does not take place. Also added is a graphing capability built into DESKTOP/PLAN-II and the capability to build files that can be read by "Appleplot".

The internal graphing capability built into DESKTOP/PLAN-II is quite useful and flexible. Line charts or bar charts are available with two variables plotted. The graphs are quickly drawn and nicely fill the page. You have the opportunity to print to an Apple Silentype printer or to store the graph as a picture on disc for later printing using another program (assuming your printer can accept graphics).

The documentation with the original version was good; with this update version, the documentation is excellent.

The discs are provided with the package. The discs cannot be copied with commercial copy programs. Should you require a replacement disc, there is a $20 fee.

A key question that is left unanswered is the ability to update models produced on the original version to a form that can be read by this new version. The manual makes no reference to this (a major shortcoming). This reviewer did not have any models handy to experiment on so no resolution can be offered.

GENERAL BUSINESS

HOW TO CHOOSE BUSINESS SOFTWARE

The first priority to consider when choosing business or professional software is to do your homework. This necessitates that you sit down and carefully evaluate your requirements before visiting your local computer store and/or calling on software houses. If you are looking for general accounting software, some questions you might ask yourself might be:

(1) In a general ledger system, how many chart-of-accounts must I have?
(2) How many transactions a month are necessary?
(3) If you need billing, does the program generate invoices as well as statements?
(4) How many invoices or statements do you produce in a month? How many a year from now?
(5) How many checks do you write per month (Accounts Payable)?
(6) If a payroll package is required — does the program handle state and local taxes? How many employees? Maximum number of deductions? Voided checks handling? Print modification allowable for pre-formatted checks?

This is just a very rough idea of the preparation you should do in understanding your own needs. And, unless you do analyze and comprehend your requirements, you have very little chance of selecting the appropriate software for your needs.

The next step is visit your local computer store and ask questions based on the homework that you've done. If by chance your local store does not carry any of the major brands or cannot reasonably answer your questions, do yourself a favor and go to another store. If they can't help you before the sale, how much support do you think you will get after the sale?

Assuming that your local dealer has recommended a program to fit your needs, take a look at the manual — is it easy to follow? Are the instructions clear?

One highly recommended task to perform before actually making your purchase is to call the company that publishes the software in which you are interested. As you may know, there are some software companies that cannot be reached by phone. That augurs well for support, doesn't it? When you call the company, ask a couple of questions that may not have been covered in your visit to the dealer. Ask about their back-up disk policy. Find out about updates. Most importantly, find out who to talk to should you have a problem your dealer can't solve. Remember, no matter how good the package might look to you superficially, it's worthless unless it is supported.

Remember, however, as an end user of a product, you also have certain responsibilities. Before complaining to a software vendor about a problem, be sure that the problem is not your lack of familiarity with your equipment. Be sure that you have read your Apple manuals and know how to use your machine, how to initialize disks, make copies, and operate your printer. Also, read thoroughly the manual that accompanies the software that you've purchased. If you do have a problem, remember to write down exactly what you were doing when the problem occurred, as well as any error message that might have appeared on your screen. Lastly, *always* make disk or tape copies of your data. If something happens and you have to re-do a lot of information because you have no back-up copy, it's back to the drawing board as a part of your responsibility in assuming that Murphy's Law ("If anything can go wrong, it will.") is a myth.

CREATIVE FINANCING

Company: Howard Software Services
Language: Applesoft
Hardware Requirements: Apple II or II + with disk. Printer helpful.

Department: Business
Sugg. Retail: $150 (intro)
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**B –**	DOCUMENTATION	**C +**	RELIABILITY	**B**
EASE OF USE	**C +**	VALUE FOR MONEY	**B –**	ERROR HANDLING	**B**
VENDOR SUPPORT	**B**	VISUAL APPEAL	**N/A**		

If there is any program on the market that exemplifies the validity of the expression, "Garbage In, Garbage Out" (GIGO), this is the one. It has so many options and opportunities for entering bad data that extreme care must be exercised in its use. Don't get the impression that the program is inferior because of this flexibility; you just must be very careful with input specifications and data.

The CREATIVE FINANCING package does more than just compute fancy real estate loans, as the name might imply. It is really a fairly complete financial planning tool, capable of handling quite complex analyses of combinations of loans, depreciation, leases/rent, operating expenses, tax consequences, and the value of money at any point in time. This package allows the user to compare optional investments , taking into account all tax consequences and inflation. Data files may be changed and saved under different names in order to handle various "what if" situations.

Be certain to *read the manual* several times before starting. The program requires the user to enter data in a specific format. All definitions are included in Appendix A of the manual. This Appendix should advisedly be read first, followed by the manual and then the examples. You will probably have to read Appendix A more than once while doing the examples in order to completely understand the data entry scheme.

The program runs in many segments. The first module is used to enter data, although it does no calculations. The second module performs all the calculations and stores the results on disk. The final module prints the results. The first two modules consist of several segments of their own. Before you can specify a print-out, you must have run both the data entry and analysis segments.

If you have an older Apple without Applesoft in ROM, you will have to do a double boot procedure using the master disk first, after which the LOADER program from the CREATIVE FINANCING disk is run. The program assumes control at that point with extensive menu-driven support.

Data entry is somewhat cumbersome, as you must first enter the data and then confirm the entry. This is done to allow you to double check each and every entry; for extensive data entry, this procedure can become somewhat tedious.

There are many areas of the program that could stand closer attention in applying human engineering. It is possible to get into many unnecessary loops. Also, the user must answer many questions that either should not be asked or should have defaults. The program is obviously written with a great deal of string manipulation, since the computer "pauses to refresh" itself many times during a session. The error-handling routines appear to work most of the time (see below) but unfortunately you can still get into loops. One particular example applies during the analysis phase, when you attempt to do an income analysis with the necessary files missing. When asked if you want to try again and you answer NO, you have to answer NO several times before the computer refreshes itself and gets you back to the menu.

The data entry module is composed of subsections that are used to record general information about the purchase, sale, and taxes; loan payments and receipts; depreciation; income information; and expense information. Analysis is limited to 25 years; if your investment has a shorter duration period, you should not use the 25 years, since calculations and reporting would be slowed down considerably. While processing the load module, you are allowed to enter up to ten distinct loans, separately defined. You may specify yourself as either the borrower or lender for each of these loans. All the common and some not-too-common loans are accommodated. The depreciation module will also handle up to ten separate schedules. There is even an option for the additional first year depreciation that the IRS has allowed on certain items in the past. The income and expense submodules also handle ten categories each.

Once data are input, the analysis will provide a cash flow analysis, a return on investment analysis, a loan analysis, a depreciation analysis, and an income/expense analysis. The analysis results are stored on disk using the generic name you supplied with letter designator extensions. Because of extensive disk access, the program runs quite slowly. Processing may require several minutes with even relatively simple analysis.

The report generation module prepares a professional report with title page and identification on each page. The setup allows you to specify left margins, plus different line and page lengths. While creating the report, the program is supposed to format the data to fit. Unfortunately, it didn't work that way on this reviewer's Apple II with the serial card and Diablo printer installed. The reports were printed, but the format was off in many places. The main problem involved the left margin. Indented printing of the five spaces requested was ignored on many lines; consequently, the report could not be three-hole punched, as was the intention. This also meant that various report pages did not line up.

The report setup is also very awkward to use. Like the rest of the program, you must take a considerable amount of time just to set up the parameters for printing.

One other problem was noted while printing the first example on the program disk. When testing the output to the screen, the documentation states that you can use the space bar to halt printing in order to examine the data. In one instance, hitting the key at random while printing resulted in halting the printout in the middle of the title line on a page. Upon attempting a restart, the program bombed due to an "ILLEGAL QUANTITY ERROR" in line 23770. This problem can be consistently duplicated; there is at least one permanent bug in this routine. The interim solution involves not stopping the printer while in the middle of a title line — kind of catch-as-catch-can, until this is brought to the attention of Howard Software Services and a program fix is implemented.

The manual includes several application examples. The user should study these with great care, along with the definitions in Appendix A. Only after this procedure is followedshould you attempt to run any of your own problems. This reviewer can't emphasize enough the need for the user to familiarize himself with the data entry parameters before running the system. Among the example applications included are a realty investment, annuities, bonds, wraparound loans, stocks on margin, buying a house with shared appreciation, and small business financing.

The examples are poorly stated in the manual. With a program as difficult as this, the authors should have included a complete printout for each example showing the exact data entry and expected output. Taking one example, for instance, the bond analysis was attempted and results were obtained; however, the example is a rather simple one with unrealistic parameters (everything is in simple numbers and the buy and sell points are right on the year start/end). When somewhat more realistic data were used, the analysis yielded some results which could be questioned.

The manual concludes with a short dissertation on understanding investment analysis. This twelve page tutorial does a good job of introducing creative financing; nonetheless, it cannot take the place of a solid course on the subject.

The CREATIVE FINANCING package is "worth the wait" as the ads say, but only if you completely understand what you are getting involved in when you use it. If you cannot do financial analysis on paper, then this program is probably not for you, since you must understand the theory before using the system.

Before buying the package you should look through the documentation. If you don't understand the terms used in data entry and in the results presentation, you will not gain much from the investment. While the program is menu-driven and generally well-constructed, it is not designed for the beginner.

DESK CALENDAR II

Company: Telephone
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $35.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

DESK CALENDAR II is a memo-type package that can store daily appointments, memos, reminders, or a diary of the day's activities. It was designed to interface with all standard clock cards, using a board to display a running digital clock at the top of the screen. However, a clock card is not necessary to use this program.

A working disk with initialized data files is generated from this program. It generates a one-year calendar starting from the month of your choice. This operation takes eight minutes. It incorporates all major holidays in its monthly files. An appointment schedule can then be entered, or reminder messages for any date of that year. Reminder messages can be flagged so that they appear every day for a full week before the event or only for that day. There is also a feature that allows one to enter a memo for every Tuesday of the year or for every 3rd Thursday. Entries can be later edited for any particular day. There is also a search function for finding any keyword included in data for a range of months, allowing you to locate a particular appointment under someone's name.

Upon entering the program, either you or your clock tells the program what day it is. You can either look at your daily schedule on screen or send it to the printer. You can also ask to see another day. Included is a feature to allow you to see all of the reminders for a particular set of dates. The program found all of the holidays but for some reason could not locate my own reminders; however, they did show up for the day requested. The program also features a perpetual calendar. Apparently, there is no range limit because B.C. dates work, too. And there were only ten months in a year back then, in the dark ages. Finally, there is an option for printing all the appointments and memos for an entire year.

The program is useful if you have a busy appointment schedule and no secretary to keep track of things. Since you wouldn't access it more than once or twice a day, it could be a fairly unobtrusive and (if used discretely) private source of scheduling information.

ORIONRATER

Company: Orion Business Systems
Language: Applesoft
Hardware Requirements: Apple II or II + 48K with disk and printer

Department: Business
Sugg. Retail: Varies
Availability: 1
Disk or Tape: Disk

The ORIONRATER is an insurance casualty rating program clearly designed for the professional insurance agent (and not the general public). The ORIONRATER is actually a series of programs which are designed to compare and print out quotes from different Property and Casualty companies for a given class of insurance coverages. The different rates may then be compared to determine the most cost effective use of insurance dollars.

The ORIONRATER series includes, at this time, the following programs:

– AUTO: can facilitate up to ten carriers on a single diskette. This package is priced at $750 for the program with four companies; extra companies can be added for $150. Updates thereafter are $75 per carrier/year. This assumes that the carrier's underwriting rules are not so complex as to require a special program (see MERCURY below).

– MERCURY CASUALTY: consists of a complex, California-only company. The cost for this company alone is $750 with yearly updates at $125.

– HOMEOWNERS/CONDO OWNERS & RENTERS: is priced at $475, including four carrier rates and updates at $50 per carrier/year.

– COMMERCIAL TRUCK: is priced at $750 for two carriers, with added carriers at $200 each and updates at $125 per carrier/year. NOTE: This program requires the Microsoft Z-80 card and 64K RAM.

– COMMERCIAL LIABILITY: includes the ISO rates for the 220 most commonly used business codes. For unusual businesses, 100 more rates can be added for $100. NOTE: Two disk drives are required for this program.

Other ratings may be produced by Orion Business Systems if you provide them the rating information necessary to produce the customized disks.

This software, as shown in the demonstration system provided for review, is easy to use, with all prompts in plain English. The system can effectively be used by non-technical people in the insurance business. In fact, it would be relatively easy to simply sit at the computer with the client, read the questions together, and get the necessary answers for the ratings. The program runs relatively fast, with the printout customized to your company. This capability allows quotes to be obtained, checked, and changed in realtime, with the customer an active participant in determining the best coverage consistent with the budget available.

The programs themselves could not be specifically reviewed because only a demonstration copy was provided; however, if the input of data is similar to the menu entry procedure of the demonstration, then data entry should be quite easy and straightforward. The program will compete with larger shared systems; the user will have to balance the trade-off involved in the cost of the program and updates against access time and the convenience that results from having the Apple available for other uses yields.

SIR ISAAC'S YIELD CALCULATOR

Company: Isaac Software
Language: Applesoft
Hardware Requirements: 48K Apple II or II +

Department: Business
Sugg. Retail: $25.00
Availability: 5
Disk or Tape: Disk

OVERALL RATING	**B**	DOCUMENTATION	**B –**	RELIABILITY	**A –**
EASE OF USE	**B**	VALUE FOR MONEY	**A**	ERROR HANDLING	**B +**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

The Yield Calculator has as its primary use determination of present value, accumulation of cash flow at a given interest rate, and yield (commonly called the internal rate of return). For this latter, you must know the starting value, the cash flow, and the ending value. Given these, you may calculate yield.

The program is quite rapid. It is written in compressed form for fast running. All calculations use standard formulae with the yield calculation being a Newton-Raphson iteration of the future value formula. Data entry may be from the keyboard, from a previously stored file, or from a file which you create using another program (the format is specified in the manual).

Because of the limited number of problems that this program will solve, the market for it may be equally limited; however at the suggested price, if you have these types of problems to solve, it is a true bargain.

As a bonus, Isaac Software has another program called *Annuities* which may be purchased at the same time as *The Yield Calculator* for an additional $10 (the program is $20 as a stand alone). Given all but one of the variables of an annuity problem, the program will solve for the missing variable. This program, too, is fast and reliable. Data entry is quite easy and straightforward. Another bargain.

VISISCHEDULE

Company: Visicorp
Language: Pascal derivative
Hardware Requirements: Apple II or II + with at least two disk drives.

Department: Business
Sugg. Retail: $300.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	**A –**	DOCUMENTATION	**A**	RELIABILITY	**A**
EASE OF USE	**B**	VALUE FOR MONEY	**B +**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

VisiCorp has developed a winner with *VisiSchedule*, their newest addition to the Visi-group of programs. With *VisiSchedule* you are able to perform complex project planning in a relatively straightforward manner. Project line items are entered with their characteristics (cost, duration, prerequisites, etc). The program then calculates and displays the corresponding schedule with associated resource allocations.

The program, running on an Apple with 48K, can handle up to 50 line items. The Language Card (or 16K card) adds capability up to a total of 160 line items. This is one case where the additional hardware is extremely helpful.

VisiSchedule uses the Critical Path Method (CPM) as its technique for analysis, as opposed to PERT (Program Analysis and Review Technique). The CPM abbreviation will be used in this review, and should not be confused with the CP/M operating system (which this program does not use). CPM is a more visual technique which produces schedule charts. PERT treats a series of events using probability to estimate expected time required to do the job and is, in this reviewer's opinion, hard to use. CPM, on the other hand, treats activity durations and definitions as fixed, and then determines where the critical path is and where slack time may be. If one variable is changed, the entire schedule will be recalculated.

The program comes with a program disk and an example disk. A backup is available for the program disk (for $20). In order to obtain it you must send in the program registration form with the money. The program disk is copy protected.

The original program was written in Pascal, but neither the Language Card nor the Pascal operating system disks are necessary. There is no source code, only the machine language implementation.

Program loading is straightforward: simply boot the program disk with a data disk in drive two. The Apple must be configured to support Pascal operation or some of the features will not work. This means that the boot disk must be in slot six and the printer must be in slot one. You may have cards in other slots, but the system will not use or recognize them. The standard 40-column screen is used even if you have an 80-column terminal card. There is a list of printers and a printer card that the program has been tested against in Appendix A of the documentation. Of particular note is that *VisiSchedule* will not work with the Mountain Hardware CPS card, the California Computer Systems parallel (7728) card, or the SSM AIO parallel card at all. There is another unworkable combination: the NEC Spinwriter 5520 with the SSM AIO serial card. One other configuration that will not work is the D.C. Hayes modem in slot three. The program will not boot in this configuration. If you have any questions, be certain to ask your dealer, or write/call VisiCorp.

The program uses the standard Visi-type menu where the arrow keys and spacebar move the cursor and the return key selects the function. This is an excellent method of selection, and other programs could learn from the example.

On boot-up, *VisiSchedule* will ask you if some basic information is correct. You'll likely have to change the date, but that is all. Dates may be entered as MM/DD/YY or DD/MM/YY, at your choice. You are also allowed to enter relative dates in the form + 60D or – 5W, which will add 60 days or subtract 5 weeks in this example. You may also manipulate months and years in this manner.

In the schedules, *VisiSchedule* will handle up to 999 time units between the period 1/1/1977 through 12/31/2065, and recognize leap years. Unfortunately, the program will only schedule on a daily or weekly basis. You cannot program a schedule where all tasks are measured in units of months or years, so long term schedules are impractical when using *VisiSchedule*. This is not a serious limitation, but should be kept in mind before buying the program since your application may depend on long term scheduling.

From the main menu you are allowed to: load a program from disk, modify or create a program in memory, clear the memory, delete files from the disk, format a disk (this requires Pascal format for data disks, DOS will not work), save the schedule in memory to disk, print the schedule, change the data disk drive (from two to six disks supported), and write to DOS (but more on that later). All functions appear to work smoothly, with adequate error trapping and recovery.

As you move into actual project scheduling you will be given options to change descriptive information, and then be led into the menu, which allows you to establish the baseline for the task. This menu covers the descriptive information such as units for the various cost tracking. As a side note here, be aware that *VisiSchedule* will only handle numbers of four non-negative integer digits; so be certain that you set the units correctly (dollars, thousands of dollars, etc).

When setting up, you can also change one, or all nine of the manpower skills which may be associated with your project. In addition, you may set your normal workweek and the holidays you expect to observe. Up to 24 days may be specified as holidays.

A full range of graphic displays designate the various jobs, such as the following examples:
> = = = = = = = = = = > A critical job (one that affects the entire project).
> – – – – – – > A non-critical job (one with slack time).
> : : : : : : : : : > A completed job.

Since the display is only 40 columns wide, there are several techniques the program uses to allow you to view the schedule. By hitting CTRL-A, the screen shifts over 40 columns, so you really have 80 columns easily available. For schedules over 80 characters long there are scroll commands which allow you to shift the schedule by an amount and direction that you specify. Displays of the manpower and direct cost figures are also available, as well as displays of a line's prerequisite and successor information.

Of course, you may modify the schedule once the data is entered. Particular lines may be moved, changed in their characteristics, and lines may be inserted and deleted as required.

Once data is entered, various manipulation techniques are available: from simple renumbering of the tasks, through sorting, to more complicated techniques of analysis, which level manpower across the schedule.

It is also possible, when marking task completion, to mark partial completion and then have the program rescheduled. This turns out to be extremely handy as the program progresses, and Murphy's Law starts to apply itself. You have an instant recalculation of the schedule to show the effect of anything not happening according to plan.

Like other VisiCorp programs, the *VisiSchedule* program supports DIF file transfer. Of course, since the program was written in Pascal and not under DOS, the process is not quite as simple as it otherwise could be.

First, realize that the schedule information is not placed into the DIF file; only the manpower and cost data will be transferred. In simple terms, what you have to do is first create a data file from the program. Then you enter the option called WRITEDOS. After several disk swaps between your *VisiSchedule* data disk and an initiated DOS disk, the DIF file is created for entry into any of the other VisiCorp programs such as *VisiCalc* for analysis, *VisiFile* or data management, and/or *VisiPlot/VisiTrend*, for statistical analysis and display. Of course, there is no provision to transfer data back to *VisiSchedule*. Appendix B in the manual has further data on transfer to other programs.

The program has an excellent error trapping routine with descriptive error messages. The backup policy does leave something to be desired. Paying $20 for a duplicate program disk (and only one is allowed) is stiff; especially considering the habit of Pascal to access the disk quite often when compared with DOS, or other assembly language programs.

VisiSchedule is a good program with many applications. It is generally well written and flexible enough for most applications; although the lack of long term scheduling may be a handicap for some.

APPLE PROJECT MANAGER [APM]

Company: Apple Computer, Inc.
Language: Applesoft
Hardware Requirements: 48K, 80-col. printer

Department: Business
Sugg. Retail: $235.00
Availability: 4
Disk: Disk

OVERALL RATING	**B–**	DOCUMENTATION	**C+**	RELIABILITY	**A**
EASE OF USE	**B**	VALUE FOR MONEY	**B–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**C**	VISUAL APPEAL	**B**		

The Apple Project Manager offers a potentially useful tool for those engaged in a complicated, multi-level project. The procedure, more commonly known as "critical path analysis," is designed to help organize your project if it is comprised of a number of time-related tasks. However, you will have to come to an understanding of how these tasks relate to one another in a sequential order *before* applying this program.

The *APM* program does a reasonable job in helping to organize formidable projects. But some disadvantage exists in the program's lack of flexibility. That is, you will probably find yourself faced with the necessity of having to reorganize all of your initial project input if any circumstances or data changes. This limitation could become frustrating if, as is common in the real world, your data undergoes a number of revisions. Finally, somewhat unusual for Apple Computer products, the documentation that accompanies the program could stand improvement as to its clarity. Bear in mind these cautions in considering this one.

TAX PREPARER

Company: Howard Software Services
Language: Applesoft
Hardware Requirements: Apple II or II +

Department: Business
Sugg. Retail: $99.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B +	DOCUMENTATION	B –	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B +	ERROR HANDLING	A
VENDOR SUPPORT	B +	VISUAL APPEAL	B		

The TAX PREPARER program is very useful for record keeping throughout the year and investigation of alternate tax strategies. Just about any schedule or form that you may need is represented in the package (schedules A, B, C, D, E, F, G, R&RP, SE, TC and forms 1040, 2210, 2106, 3468, 4562, 4726, 4797, and 5695).

It is important to note that this is a record keeping program and not a program which will tell you what to do to optimize your tax position. You must make the decisions on what to enter on to the forms and what is legal and not. This is important to remember when using any program of this type. Another important point to keep in mind is that there is no guarantee put forth by the software vendor regarding the accuracy of computations in the program. The IRS insists on holding you responsible for the accuracy of what you turn in to them. This is not to imply that the TAX PREPARER makes errors. It is only an advisory that you will be held responsible for inaccurate input results.

All of the software worked as advertised and updates for each form were posted to the 1040 as required. It is possible to make errors if certain forms are used before others, but these cases are spelled out in the instructions. Records are kept by code name so that several files can be placed on a data disk either to record different strategies or to accommodate several clients should the program be used for commercial tax preparation. This is very convenient.

Output can be either to the screen or to a line printer. If line printer output is used, the form may be sent directly to the IRS as part of your tax return (except form 1040). In the case of the 1040 requirements, there are provisions for formatted output onto a standard form 1040.

Another useful feature is the ability to create itemized lists for various entries. The system lists of up to 1,000 entries, each of which will be summarized by the program and totals entered onto the appropriate forms. The lists may be printed as supporting data for the IRS.

Data entry is relatively convenient and editing data entries is quite convenient. This helps when studying alternatives.

Program documentation is marginal. The instructions will allow you to run the programs properly but that is about all. Only a few forms are provided in the appendix. A sample return is included with the program disk, which is helpful in learning how to use the program. Error trapping is relatively good in handling user problems. Nonetheless, it is possible to bomb the program by doing really offbeat things.

Because tax laws change yearly, Howard Software offers a nice update package. Each year in January, an update will be produced and be available to all users "...at a fraction of the cost of your original disk." In addition, packages which include more forms are in preparation along with certain state returns.

This is a very useful and well-designed package, with nice functional features.

EXECUTIVE BRIEFING SYSTEM (EBS)

Company: Professional Software Technology, Inc.
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $99.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

Without question, graphic presentation of data is almost always more dramatic, meaningful, and memorable than simple printouts. The *Executive Briefing System* offers a topnotch graphics display program that makes the most of the graphics capabilities of the Apple II/II +.

EBS is a two-pronged graphics program. The first part is an edit module which allows the creation of computer slides; the second module allows you to display these slides successively on the screen. Color, text, lines, circles, and so forth are easily controlled with this program. And, as a welcome bonus, the documentation is excellent. You may use any of three type fonts in four different styles, in both uppercase and lowercase, and the program will display the information in three ways: (1) automatically; (2) manually; and (3) in combination.

In turning your Apple computer into a versatile slide projector, the *EBS* offers an excellent application program. Well worth investigating if you make use of graphics in a business environment.

MOONLIGHTER TAX GUIDE

Company: Shafer Software
Language: Applesoft
Hardware Requirements: Apple II or II +

Department: Business
Sugg. Retail: $40.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C –	DOCUMENTATION	D	RELIABILITY	C
EASE OF USE	C	VALUE FOR MONEY	C –	ERROR HANDLING	C
VENDOR SUPPORT	C	VISUAL APPEAL	C		

While the idea behind this program is good, the program itself is not very useful. It is advertised as a teaching and record keeping aid for the person who is involved in a small part-time business for profit. The bad part is that the manual is inadequate for accomplishing the advertised instruction (although the company will sell you a book to do that!); if you have the data handy to input to the program at run time, you do not need the program!

Everything in the program is screen-oriented, with no option for use of the printer, even if you have one.

Nothing in the program is user-oriented. The program does not even start running upon booting the disk! The critical instructions on starting the program are on page 3 of the manual – which was blank in the review copy.

The introduction program makes effective use of the Ron and Darrell Aldrich program HIGHER TEXT. The problem is that when it finishes, it leaves the Apple in HIGHER TEXT mode and follow-on programs are not set up to use that program. The result is that you cannot read the screen in the following program which asks you questions as a test! This is because the HIGHER TEXT routines do not clear the screen with a HOME command; it takes a CTRL-L.

Another annoying feature is the need to continually type in your name. The various stages of the program should be modular for the convenience of the user. Different files could be accessed through a catalog type command.

The program that fills out the Schedule C tax form simply takes information in the order specified on the form and records it in memory, after which you record it on the form. No printer is supported. The only calculations performed are the totals plus some basic depreciation. In truth, with the required data entered, combined with the use of a calculator, you could probably do the job faster by hand, considering the processing level of the program. For more complicated schedules, the instructions refer you to your tax advisor.

In summary, the program is too basic to be of much value. A better investment would be a book on the subject.

ESTATE TAX PLAN 1.2

Company: Aardvark Software Inc.
Language: Runtime Pascal
Hardware Requirements: 48K, 80-col. printer

Department: Business
Sugg. Retail: $495.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B –	RELIABILITY	B +
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B +
VENDOR SUPPORT	B	VISUAL APPEAL	B		

In these economically perilous times, any program that adequately addresses problems in personal financial planning deserves attention. *Estate Tax Planning* is just such a program. Estate tax law is complicated, but this program seems to have most of the bases covered. It is up-to-date, using the recently enacted Economic Recovery Tax Act of 1981; and an update service is available to keep the program current.

Estate Tax Planning provides for the many specific factors necessary for an estate analysis: allowable deductions, disposition of assets, death tax liabilities, special deductions, bequests, and so on. One excellent feature of the program is that you can operate it in a "What if?" fashion, which lets you manipulate several financial alternatives at once in order to come up with the best plan or plans.

The biggest drawback of the program, however, is that the user really has to be an expert in this field, as well as in legal matters, in order to take full advantage of *Estate Tax Planning*. A better approach might have been to expend the necessary time and effort required to make the program more tutorial in design. This does not mean that it should make everyone experts in this field; but it is important that individuals have at least a fundamental knowledge of estate planning. Then, after the user runs a number of assumptions, it should be reviewed with an expert. This could only be more productive in terms of the user's real needs.

PROPERTY MANAGEMENT

Company: Continental Software
Language: Applesoft
Hardware Requirements: 48K, 2 Disk Drives, Printer (132 columns)

Department: Business
Sugg. Retail: $495.00
Availability: 8
Disk or Tape: Disk

Continental Software's *Property Management* system is designed to help automate all of the bookkeeping functions normally required in the management of income property. It is applicable to both residential and commercial properties, and provides time- and money-saving assistance to either the professional property manager or to an individual owner. To begin, the user records detailed information (much of it optional) about each property and all of its rental units and tenants. This information can be printed in several different report formats. These reports show rental unit characteristics such as size, rate per square foot, number of bedrooms and baths, utilities paid for, etc, as well as such tenant information as name and address, telephone, lease dates, rent amounts, alternate mailing addresses, and more.

Each month the standard rental charges are automatically posted to each tenant's balances. Then, throughout the month, the program records a complete transaction history of all tenant charges, deposits, payments, refunds, and write-offs, maintaining current balances for all accounts. There is a complete, printable audit trail for all transactions which take place during the month.

In addition, all property-related expenses, depreciation, and non-rent income may be recorded in a flexible IRS-like income/expense format which can be modified and expanded in order to create custom reports.

Although the program uses double-entry bookkeeping internally, this is transparent to the user unless he elects to interface to other Continental Software CPA accounting packages. In the latter case, each month the program can automatically receive summary account information from the *Accounts Payable* program (if computer check printing for bills is desirable), and/or transfer summary account information to the *General Ledger* program (for a Balance Sheet and more detailed Profit and Loss Statement).

Many well-organized and readable reports can be printed, with user-selectable variations. These include property and rental unit descriptions, tenant information, rental status, transaction history (audit trail), and an income/expense summary. In addition, the program can produce a formal, accounts-receivable type ageing report (with variable ageing intervals). It can also print out tenant statements with mailing labels, if desired.

Other notable features include: (1) tenant rent dates may vary throughout the month; (2) tenants who are overdue or scheduled to vacate within some specified period can be flagged in on-screen or printed reports; (3) as an option, late charges can be automatically computed and posted to delinquent tenants; and (4) rent increase dates and percentages can be recorded and printed for rent control purposes.

Accompanying this program is an extremely thorough users manual of over 200 pages, which includes step-by-step instructions with detailed screen representations, a diagram showing monthly processing steps, a complete set of sample reports, a glossary, and a very complete index.

The following system capacities apply to a 48K Apple with 2 standard mini-floppy disk drives: A maximum of 10 properties, each with a separate set of books, may be stored on a single data diskette. (There is no limit on the number of data diskettes which can be generated.) A maximum of 100 rental units (and tenants) can be defined for a single property. This means that a single diskette can store one complex of 100 units, or two of 50 units, or ten of 10 units. Future versions taking advantage of storage devices with greater capacity are planned.

The program itself is easy to use, although some thought must be given in advance as to the organization of accounts. Data input has deliberately been made as easy and foolproof as possible, and the well-organized menus allow speedy access from one program segment to another.

This program is an extremely useful and cost-effective tool for the professional property manager. However, it can also assist the individual investor with several units of income property by helping him to formalize his bookkeeping habits, with an eye toward greater profitability (e.g. from reduced losses due to misplaced or incomplete information); provide assistance at tax time; or keep investment partners adequately informed. If any of these fit your situation, then the *Property Management* system merits your consideration.

SAMPLE REPORTS:

RENTAL STATUS REPORT

PROPERTY: BLDG 1
EVERGREEN APTS.
3685 ARTESIA BLVD.
TORRANCE, CA 90504

GML PROPERTY MANAGEMENT
4038 SOUTH STREET
HAWTHORNE, CA 90250

REPORT DATE: 03/31/81 PREPARED: 03/01/81 V1.0 PAGE: 1

TEN. CODE	APT#	R/U TYPE	TENANT NAME	MO.RENT	CURRENT BAL/DUE	BALANCES TOT/DEP	LAST COLL DATE	CURRENT MO.COLL	RENT DUE DATE	LEASE EXPIRES	TELEPHONE NUMBER
JONES	#1	SNG	JONES, SAMUEL K.	350.00	0.00	600.00	03/05/81	350.00	03/01/81	01/01/82	(213) 723-8110
SMITH	#2	1BR	SMITH, SUSAN A.	400.00	0.00	1000.00	03/05/81	400.00	03/15/81	10/15/81	(213) 723-493[illegible]
THOMAS	#3	2BR	THOMAS, DALE M.	525.00	0.00	1125.00	03/05/81	525.00	03/01/81		(213) 723-6001
VARGA	#4	3BR	VARGA, LISA P.	650.00	360.00	0.00		0.00	03/15/81	03/15/81	(213) 860-2181
			**** OVERDUE ****								
	#5	4BR	*** VACANT ***	1000.00							
			PROPERTY TOTALS:	2925.00	360.00	2725.00		1275.00			

RENTAL UNIT INFORMATION REPORT

PROPERTY: BLDG 1
EVERGREEN APTS.
3685 ARTESIA BLVD.
TORRANCE, CA 90504

GWL PROPERTY MANAGEMENT
4038 SOUTH STREET
HAWTHORNE, CA 90250

REPORT DATE: 03/01/81 PREPARED: 03/01/81 V1.0 PAGE: 1

-- UNIT -- APT#	R/U TYPE	#BR (NOTE 1)	#BA	FPL	CHL	DESCRIPTION PET (NOTE 2)	F/U	UTL	PRK BAR (NOTE 3)	NOMINAL RENT RENT	SQ.FT.	SEC/DEP RATE	PREVIOUS PREV. RENT	% INCR DATE	YTD RENTAL INCOME	VACANCY LOSS
#1	SNG	1 (SINGLE)	1	N	N	N (FULLY FURNISHED)	F	WATER	1 N (ROLLAWAY CORNER BED)	350.00	600 .58	500.00	300.00	16.0% 01/01/81	0.00	0.00
#2	1BR	1 (REFRIGERATOR)	1	N	N	N (FULLY FURNISHED)	F	WATER	1 N	400.00	800 .50	500.00	350.00	14.3% 01/01/81	0.00	0.00
#3	2BR	2 (LARGE KITCHEN)	1	N	N	N	U	WATER	1 N	500.00	1000 .50	500.00	450.00	11.1% 01/01/81	0.00	0.00
#4	3BR	3 (TOWN HOUSE)	2	Y	Y	N (SUN PORCH)	U	WATER	2 N	650.00	1200 .54	650.00	600.00	8.3% 01/01/81	0.00	0.00
#5	4BR	4 (BACK PATIO)	2	Y	Y	Y (DEN)	U	WATER	2 Y (CITY VIEW)	1000.00	1500 .67	1000.00	900.00	11.1% 01/01/81	0.00	0.00
		PROPERTY TOTALS:								2900.00		3150.00			0.00	0.00

INCOME/EXPENSE REPORT

PROPERTY: BLDG 1
EVERGREEN APTS.
3685 ARTESIA BLVD.
TORRANCE, CA 90504

GWL PROPERTY MANAGEMENT
4038 SOUTH STREET
HAWTHORNE, CA 90250
CASH BASIS

REPORT DATE: 03/31/81 PREPARED: 03/01/81 V1.0 PAGE: 1

ACCT#	DESCRIPTION	MONTH-TO-DATE	% TOTAL	YEAR-TO-DATE	% TOTAL
	INCOME				
4040	RENTAL INCOME	2275.00	70.98 %	2275.00	70.98 %
4050	PARKING INCOME	50.00	1.56 %	50.00	1.56 %
4060	POOL INCOME	0.00	0.00 %	0.00	0.00 %
4065	KITCH EQUIP RENTAL	30.00	.94 %	30.00	.94 %
4070	MISC/LATE CHARGE INCOME	0.00	0.00 %	0.00	0.00 %
4080	SEC/DEP FORFEITED	750.00	23.40 %	750.00	23.40 %
4090	CLN/DEP FORFEITED	100.00	3.12 %	100.00	3.12 %
	TOTAL INCOME	3205.00	100.00 %	3205.00	100.00 %
	EXPENSES				
5110	ADVERTISING	0.00	0.00 %	0.00	0.00 %
5120	AUTO & TRAVEL	20.00	.62 %	20.00	.62 %
5130	CLEANING	0.00	0.00 %	0.00	0.00 %
5140	COMMISSIONS & SALARIES	0.00	0.00 %	0.00	0.00 %
5150	GARDENING & LANDSCAPING	40.00	1.25 %	40.00	1.25 %
5160	INSURANCE	0.00	0.00 %	0.00	0.00 %
5165	*SUBTOTAL 1	60.00	1.87 %	60.00	1.87 %
5170	INTEREST - 1ST	175.00	5.46 %	175.00	5.46 %
5180	INTEREST - 2ND	0.00	0.00 %	0.00	0.00 %
5190	INTEREST - 3RD	0.00	0.00 %	0.00	0.00 %

REPORT CONTINUED ON FOLLOWING PAGE

TENANT INFORMATION REPORT

PROPERTY: BLDG 2
UNION BANK BLDG
12345 HAWTHORNE
INGLEWOOD, CA 90304

(INCLUDING RENT DETAIL)
GWL PROPERTY MANAGEMENT
4038 SOUTH STREET
HAWTHORNE, CA 90250

REPORT DATE: 03/01/81 PREPARED: 03/01/81 V1.0 PAGE: 1

TEN CODE	SUITE#	R/U TYPE	TENANT NAME (CONTACT)	TELEPHONE (DESCRIPTION)	LEASE BEG END	#KEYS TEN	LIC # SINCE	TOT NO. RENT	TOT/DEP AMOUNT	STATEMENTS ?	ADDRESS
ACE	#1001	EXT	ACE MANUFACTURING CO. ROBERT J. BOLLEN	(213) 804-1387 TOOL MAKER	MNTH/MNTH 01/01/81	1	MANY	1500.00	500.00	Y	(USE PROPERTY)
							MO. RENT 1500.00	DESCRIPTION MO RENT			
ZETA	#1002	INT	ZETA PRODUCTS INCORP. ALBERT SELLERS	(213) 371-8654 PRNTING SUPP	04/05/80 04/05/81 04/05/80	1	MANY	2000.00	3000.00	Y	1234 MAPLE STREET TORRANCE CA 90710
			** NOTICE TO VACATE:		04/05/81		MO. RENT 2000.00	DESCRIPTION MO RENT			
SUPER	#1003	EXT	SUPERSOFT WARES JACK HOFFER	(213) 370-0048 COMPUTER S/W	05/10/80 05/10/81	1	MANY 05/10/79	800.00	1500.00	Y	(USE PROPERTY)
							MO. RENT 800.00	DESCRIPTION MO RENT			
			PROPERTY TOTALS:					4300.00	5000.00		

VISICALC TEMPLATES
REAL ESTATE ANALYST

Company: Apple Computer Inc.
Language: Applesoft
Hardware Requirements: 48K & Disk & Printer (optional)

Department: Business
Sugg. Retail: $79.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	B–	VALUE FOR MONEY	B	ERROR HANDLING	B
VENDOR SUPPORT	C–	VISUAL APPEAL	B		

A totally new type of software package, utilizing VISICALC as a "mother" and The Real Estate Analyst Series as a Real Estate Descriptive tool is a unique concept.

This software is designed for the serious real estate investor and the professional; it is a very good price/performance investment in itself. If you have ever been asked by your local S & L institution for a financial statement, you will appreciate this program. You simply enter the data and it prints a financial statement for you (saves that CPA fee, too).

The program provides the following reports: 1) Monthly Amortization Calculator, 2) Monthly Amortization, 3) Amortization/Annual Summary, 4) Mortgage Loan Analysis, 5) Comparative Depreciation Schedule, 6) Personal Financial Statement, 7) Income Property Investment Analysis/Declining Balance Depreciation, and 9) Income Property Investment Analysis/Sum of the Years Digits.

The software that I received was protected; therefore, a copy cannot be made, making it a bit difficult if one has a problem.

To use the system, you must load VISICALC, then, following the prompt instructions, load one of the above programs. Numbers for Creative Financing are easy to plug in; the printed reports are well organized and logically formatted.

For those of us deeply involved in Real Estate, this is a good program well worth the investment.

REAL ESTATE ANALYZER

Company: Howardsoft
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $150.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	B+
EASE OF USE	B–	VALUE FOR MONEY	B	ERROR HANDLING	B+
VENDOR SUPPORT	B	VISUAL APPEAL	B+		

The major purpose of the REAL ESTATE ANALYZER is to provide buy and sell decision-making on cash flow and return-on-investment (ROI) investment properties. The varied and comprehensive factors in the system include income tax considerations, capital gains tax impacts from selling the property, depreciation recapture inflation rate influence on income, expenses, costs and (again) taxes. Depreciation schedules, complex loan financing and the aforementioned factors, in combination, allow for pre-and post-tax prediction analysis for buy/sell decisions. Investment risks on rate-of-return for unlike properties can also be calculated. All this amounts to a monumental chunk of detailed display and/or printed output, most of which is very enlightening.

A semi-tutorial approach is used in the manual, including a glossary of real-estate terminology, which turns out to be very lucid and helpful in its easily referenced "DEFINITIONS" section. A sample information worksheet form is provided for multi-copies, if necessary. Well-written explanations of the technical analyses are included, concise and logical. All-in-all, a complete and not overly-lengthy manual.

The sample property demo takes you through the operating procedures with clear and well-organized prompts. Altering the displays with inputs provides insights into investment impacts. Hours can be spent in changing the environment until you finally attain the status of a wealthy land tycoon. Unfortunately, if you continue to pursue this course, you've also changed the intent of the system to one of a land-parlaying adventure; you have to be careful in determining the boundary between reality and fantasy if this is to be a real-life investment tool.

An inherent problem in a package of this type is the general volatility of the market during this period of realty recession. With variable rate mortgages, all-inclusive trust deeds, three and five year take-back interest-only loans and continuing similar gyrations in creative financing, the real estate investment arena does not lend itself to defining parameters required for an effective computer system. Obsolescence in financing procedures is certain. However, Howardsoft is hopefully addressing that inconsistency with its CREATIVE FINANCING package (as yet unreviewed), as the name implies.

The usefulness of this system might be considered dubious at a time when real estate investment is (with the exception of the extremely knowledgeable), at best, questionable. Considering the versatility of the REAL ESTATE ANALYZER, such an attitude would be missing the point. It is also an excellent learning tool. Another more realistic attitude might involve purchasing this package as a tax write-off used in determining what should be the optimum investment property for a larger tax write-off (if you are one of those very affluent investors).

Overall, this nicely-packaged system is a very well-constructed and fascinating tool for real-estate investment analysis; its usefulness is qualified by its potential future utility when, hopefully, the real estate investment market has stabilized in opposition to fluctuating interest rates and monetary conditions.

THE DEPRECIATION PLANNER

Company: Dakin 5 Corporation
Language: Applesoft
Hardware Requirements: 48K, 80-col. printer

Department: Business
Sugg. Retail: $395.00
Availability: 3
Disk: Disk

OVERALL RATING	A	DOCUMENTATION	A+	RELIABILITY	A+
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A+
VENDOR SUPPORT	A	VISUAL APPEAL	A		

Depreciation Planner is a worthy and necessary tool if your business is of sufficient size to require records and planning for your capitalized assets. The program is current, in accord with the latest provisions of the 1981 Tax Act. And it is flexible enough to allow you to change the schedules should the tax laws change again.

Documentation and customer support on this package are first rate. Have your accountant or financial officer check this one out for you. Well worth looking into.

REAL ESTATE ANALYSIS

Company: Powersoft
Language: Applesoft
Hardware Requirements: 32K

Department: Business
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

The program provides three primary features: 1. Real Estate Analysis Program. 2. Generation of Amortization Schedule. 3. Generation of Depreciation Schedule.

Real Estate Analysis Program Section — This section provides for a variety of input parameters relating to income property analysis and can be used to provide a meaningful analysis of a selected income property. Input parameters are divided into three separate sections: Section 1 - Loan Data, 2. Income, and 3. Operating Expenses. Section 1 Loan Data has an option for existing or new financing. Its limitation, however, is that multiple loans are not considered. Section 2 - Income provides for rental income, yearly increase in rent, vacancy factor, and "other income" (remaining combined income). Section 3 - Operations Expenses has an option for lumped operational expenses or detailed inputs. The program is set up so that it is easy to change (or edit) any individual input parameter and run comparative data as a result of the changes made. The output may be displayed or printed and consists of a summary of the data input and an analysis summary of the results by year (number of years for analysis is selectable). Analysis consists of cash flow before and after taxes, adjusted basis, capital gain, pre- and post-tax proceeds, and return on investment. A set of seven plots is available for display only. The user is cautioned to go through a hand calculation of the results so that he can fully understand the treatment of the various data output; additionally, the documentation must be read very carefully to be aware of the assumptions made. As an example, the value used for depreciation is taken as 85% of the purchase price; this may be valid for some properties but not for others. Sections two and three provide amortization and depreciation schedules and are fairly straightforward.

To sum up, this is a handy program for the individual, less so for the professional.

REAL ESTATE MODELS FOR THE EIGHTIES

Company: Commercial Software Systems
Language: Machine
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $65.00
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A–	ERROR HANDLING	A
VENDOR SUPPORT	B+	VISUAL APPEAL	B		

As anyone knows who has any involvement at all with real estate, the days of the simple fixed rate mortgage are over. Today, almost every real estate deal involves some sort of "creative financing." This situation has given rise to a new language. Before buying or selling you should be familiar with such mortgage terms as: adjustable rate, graduated payments, wraparounds, balloon payments, and buy downs.

You'll find *Real Estate Models for the Eighties* to be a productive tool in assisting you to evaluate these new types of mortgages. The program is set up as a series of *VisiCalc*-compatible templates; this means that these models are pre-formed for you and must be loaded into your *VisiCalc* program. The specific templates include:

(1) Detail amortization
(2) Summary amortization
(3) Comparative depreciation
(4) Wraparound mortgage
(5) Cash flow and equity return protection
(6) Tax consequences
(7) "No Interest" mortgage
(8) Shared equity appreciation
(9) Adjustable rate mortgage
(10) Loan buydown analysis

Each template provides an adequate and useful analysis.

Documentation is sparse, but it is usable provided you are already familiar with the above terms. I would have preferred the inclusion of a fuller description of each template, to assist those not deeply knowledgable in real estate financing. It effectively requires an *a priori* expertise in real estate. But apart from these limitations, the program works well, and generally meets the objectives that it sets out to achieve. Not for the novice, but worth investigating.

INFOTORY

Company: S.S.R. Corp.
Language: Applesoft
Hardware Requirements: 48K, 2 Disk Drive & Printer

Department: Business
Sugg. Retail: $295.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B+	VISUAL APPEAL	A		

INFOTORY, an Inventory Management System by S.S.R. Corp. of Rochester New York, is a complete system for keeping track of purchase orders and inventory for a business which does not have more than 9999 items of one type in its inventory. An Apple II or Apple II Plus with 48K and Applesoft in Rom is needed with two disk drives. A printer which allows 80 columns on 9.5 x 11 inch paper with 66 lines per page is necessary for all reports. There is no way to change these requirements, as the Program Disk is copy protected. The printer card can be either a serial or parallel interface version and the DOS controller card can be 3.3 or 3.2.1. If a 3.3 DOS edition is used, the program can handle about 1200 inventory items; otherwise, only 1000 can be used.

The Package comes with two Disks: one a program disk and the other a Data disk with a sample inventory program on it. The documentation is quite extensive and supplies all information necessary to get the system up and running. The programs are menu-driven with three daily entries which are Receiving, Sales and Purchase Orders. As these are entered, a printed copy is made of all transactions so there is a complete audit trail available at all times.

INFOTORY can allow a user to make an inquiry on any item and will provide Inventory reports, price lists, sales and cost analysis as desired. Also, in addition to this, there is available a very unique report called ANYREPORT which allows the user to create many various reports using many different combinations of available fields or data elements. The program which allows one to keep track of purchase orders is very useful in that it provides you a way of knowing when to replenish stock on hand.

The Menu for the Program Disk is as follows:

1. RECEIVING ENTRY
2. SALES ENTRY
3. ON ORDER P/O ENTRY

(Note: These are daily entries)

4. INQUIRY ON ITEMS
5. INVENTORY REPORT
6. PRICE LIST
7. SALES & COST ANALYSIS
8. ANYREPORT

(These are information & reports)

9. ADD NEW ITEMS (INVENTORY)
10. CHANGE/UPDATE ITEMS
11. DELETE ITEMS
12. CLEAR SALES/COST DATA (for new period)
13. INITIALIZE NEW DATA DISKS

(This is the data maintenance section)

The stored Data items are:

AVG. COST	DESCR	ITEM#
LOCATION	ON ORDER	PERIOD COST
PERIOD SALES	PRICE	QTY ON HAND
QTY SOLD		

The program calculates the cost on hand, cost on order, gross profit, percentage of gross profit, margin and percentage of margin, as well as maintaining a reorder flag.

All in all, this is a very complete program for a business that does not have too many of the same items in stock (max 9999) and does not have an item that sells for more than $9,999.99. Also no more than 9999 items of one kind can be sold.

ACCOUNTING

THE COMPUTER PROGRAMMED ACCOUNTANT GENERAL LEDGER, ACCOUNTS RECEIVABLE, ACCOUNTS PAYABLE, PAYROLL

Department: Business

Company: Continental Software

Sugg. Retail: $250.00 each*

Language: Applesoft

Availability: 7

Hardware Requirements: 48K, 2 Disk Drives, DOS 3.3 Printer [132 Col.]

Disk or Tape: Disk*

Continental Software produces four accounting modules under the general name of The Computer Programmed Accountant (CPA). They are:

(1) **General Ledger**
(2) **Accounts Receivable**
(3) **Accounts Payable**
(4) **Payroll**

Since all the modules have some common points, we'll cover those first before going into each of the modules in detail.

First, the documentation and manuals that accompany each of the modules are among the best we've seen. The approach used is to print the screen, as is seen on the user's display device, in the manual . To the right of each screen, the appropriate instructions are printed. This approach allows the user to be guided in a step-by-step fashion through the initial start-up of the programs and subsequent sub-programs and procedures. It would be difficult to overemphasize how important it is to have thorough and easy documentation for comprehensive application programs, particularly for the first time user.

Another welcome feature is the use of menu-driven programs. It's a breeze to move from one program to another in all of the modules, though especially true in Accounts Receivable, Accounts Payable and Payroll which were written after The General Ledger.

It should be clearly noted here that each of the CPA modules may be purchased and used separately or together as a completely integrated accounting system.

GENERAL LEDGER

Any General Ledger, by its very nature, can by complicated to implement. This is especially true if the intended user is not an accountant and perhaps is also new to computers. It is therefore extremely important that a General Ledger Program meant to be used by the non-accountant be as easy to use as possible, as error-free as possible, and at the same time be powerful enough to provide quick, accurate and meaningful information to the user. It is equally important that the program provide the user's accountant with accurate, concise figures derived from established accounting principles with verifiable audit trails.

Continental Software has done a good job in achieving these objectives.

FEATURES:

A) The program comes with a complete chart of accounts that can be used as is or modified for the user's specifications. The user may also design his own custom chart of accounts by using the pre-printed form that accompanies the package.

B) Data entry is easily accommodated, since the user is again provided with a form for that purpose and the program itself checks that everything is in balance before allowing posting.

D) The program generates well-designed and readable reports:

1) Profit and Loss Statement
2) Trial Balance
3) Balance Sheet
4) Complete Journal Activity Report

E) A unique feature provided is that data in any account may be graphed and displayed on the screen.

SPECIFICATIONS:

1) 120 accounts in the Chart of Accounts
2) Approximately 1,000 transactions per month
3) Provides current year vs. previous year figures
4) Maintains approximately (depending on number of monthly transactions) a single year's history

P R O F I T & L O S S S T A T E M E N T

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000
DIVISION : CONSOLIDATED

REPORT DATE: 08/31/80

AUGUST - CURRENT YEAR

	CURRENT MONTH RATIO	CURRENT MONTH AMOUNT	YEAR TO DATE RATIO	YEAR TO DATE AMOUNT
			SALES/REVENUE	
SALES				
TAXABLE SALES	96.89	45222.65	96.89	45220.65
OTHER INCOME	3.11	1453.48	3.11	1453.48
TOTAL SALES	100.00	46674.13	100.00	46674.13
COST OF SALES				
PURCHASES	33.82	15783.40	33.82	15783.40
FREIGHT IN	1.92	897.10	1.92	897.10
TOTAL COST OF SALES	35.74	16680.50	35.74	16680.50
GROSS. PROFIT	64.26	29993.63	64.26	29993.63
			EXPENSES	
OPERATING EXPENSES				
PAYROLL/SALARIES	17.38	8111.77	17.38	8111.77
PAYROLL TAXES	1.07	497.25	1.07	497.25
LEGAL/ACCOUNTING	.21	100.00	.21	100.00
ADVERTISING/PROMOTION	4.29	2001.96	4.29	2001.96
JANITORIAL SERVICE	.11	50.00	.11	50.00
RENT	1.29	600.00	1.29	600.00
TELEPHONE	.33	153.30	.33	153.30
UTILITIES	.10	48.00	.10	48.00
OFFICE SUPPLIES	.24	110.80	.24	110.80
GAS & OIL	.39	183.00	.39	183.00
INSURANCE	.80	375.00	.80	375.00
DEPRECIATION	1.56	730.00	1.56	730.00
LIC & BUS TAXES	.11	50.00	.11	50.00
BANK CHARGES	.03	13.00	.03	13.00
TOTAL EXPENSES	27.90	13024.08	27.90	13024.08
NET INCOME	36.36	16969.55	36.36	16969.55

PREPARED WITHOUT AUDIT OR OTHER INDEPENDENT VERIFICATION
PLEASE SEE LETTER OF TRANSMITTAL

B A L A N C E S H E E T

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

REPORT DATE: 08/31/80

AS OF 8 / 80

	ASSETS	
CURRENT ASSETS		
CASH CK A/C #1	3000.00	
CASH CK A/C #2	10000.00	
PETTY CASH	100.00	
ACCOUNTS RECEIVABLE	25000.00	
MERCH INVENTORY	33333.15	
PREPAID EXPENSES	1000.00	
TOTAL CURRENT ASSETS		72433.15
FIXED ASSETS		
OFFICE FURNITURE	12000.00	
CAPITAL EQUIP.	3000.00	
CAP.EQUIP. ACC DEPREC	-97.88	
FURN. ACC DEPREC	-753.10	
TOTAL FIXED ASSETS		14149.02
TOTAL ASSETS		86582.17

ACCOUNTS RECEIVABLE

First things first. In this module, the user is able to print invoices. In the past, this reviewer has found it somewhat surprising that in all the Accounts Receivable programs for the Apple that I have encountered, they only allowed statement printing — no invoicing. I realize that businesses differ in operation but I'm sure that many small businesses are similar to mine (computer supplies) in that I use invoicing almost exclusively and send statements only as a back-up or as a prompter for overdue accounts. In any event, with this program you can do both.

Invoices and credit memos may be carried on an open item or balance forward basis and can be shown either way when statements are printed. There are several options for printing statements, such as, by selected customer or only those with overdue balances.

Another seldom found but nice feature involving this module is the fact that you have the option of printing your invoices and statements on either blank computer paper (as in most programs) or on pre-printed, three-part carbonless forms (available from Continental Software).

An interesting touch is the way the user can define what constitutes column headings on a computer — a simulated manual journal. Sales categories — up to four — may be defined for the Sales Journal, and sources of cash — up to five — may be defined for the Cash Receipts Journal. This allows income and cash to be "spread" among several accounts if necessary. Thus, the user may allocate sales as needed.

Both the summary Aging Report and the detailed Aging Report are well designed, with an individual's name and phone number included for quick follow-up on overdue accounts.

The other reports generated by this package include a sales report showing the month's and year-to-date sales and last date of sale, Journal Reports, Customer Lists and Labels and a General Ledger Posting Report.

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

PAGE 1

ACCOUNTS RECEIVABLE AGING REPORT
<< 02/06/81 >>

OPEN INVOICES

INV. #	DATE	CURRENT	31-60	61-90	91-120	121-150	OVER 150	TOTAL
301	02/03/81	1361.00						
302	02/03/81	80.00						
TOTAL INVOICES		1441.00	0.00	0.00	0.00	0.00	0.00	1441.00

OPEN CREDIT MEMOS

REF. #	DATE	CURRENT	31-60	61-90	91-120	121-150	OVER 150	TOTAL
100	02/03/81	10.00						
400	02/03/81	265.00						
TOTAL CR MEM		275.00	0.00	0.00	0.00	0.00	0.00	0.00

TOTAL ACCOUNTS RECEIVABLE

CURRENT	31-60	61-90	91-120	121-150	OVER 150	TOTAL
1716.00	0.00	0.00	0.00	0.00	0.00	1716.00

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

INVOICE NUMBER 1236
INVOICE DATE 03/01/81

SOLD TO: FRED SMITH
1111 E. 1ST STREET
SAN PEDRO, CA 90277
ATTN. ACCOUNTS PAYABLE

SHIP TO: SAME

DATE SHIPPED	SHIPPED VIA	F.O.B.	TERMS	SALESMAN	DATE ORDERED	CUSTOMER
02/28/81	TRUCK	LA	NET 30	JOE	02/15/81	123344

QTY ORD	QTY SHIP	QTY B/O	DESCRIPTION	UNIT PRICE	EXTENSION
15	15	0	SOME STUFF	5.25	78.75

THANK YOU!

SUB-TOTAL	78.75	SHIPPING CHARGES	20.00
SALES TAX	0.00	PLEASE PAY THIS AMOUNT	98.75

ORIGINAL

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

FRED SMITH
1111 E. 1ST STREET
SAN PEDRO, CA 90277
ATTN. ACCOUNTS PAYABLE

DATE	CUSTOMER NUMBER
02/06/81	5

TERMS

STATEMENT

CHARGES DATE	OUR INVOICE NUMBER	AMOUNT	PAYMENTS/CREDITS DATE	REFERENCE NUMBER	CODE	AMOUNT	CODE EXPLANATION
02 03 81	301	1361.00					
02 03 81	302	80.00					
			02 03 81	100	CR	10.00	CR OUR CREDIT MEMO *
			02 03 81	400	CR	265.00	CK YOUR CHECK *
			02 06 81	2643	CK	129.00	* CLOSED ITEM

CURRENT	30 - 60 DAYS	61 - 90 DAYS	91 - 120 DAYS	121 - 150 DAYS	OVER 150	BALANCE DUE
1037.00	0.00	0.00	0.00	0.00	0.00	1037.00

CR= CREDIT MEMO, CK= YOUR CHECK, *= CLOSED ITEM

ALL INVOICES LISTED ABOVE ARE SUBJECT TO THE STANDARD TERMS AND CONDITIONS PRINTED THEREON

ORIGINAL

ACCOUNTS PAYABLE

In most respects, this module operates just like Accounts Receivable in reverse.

The module prints checks and allows you to mark which invoices you want to pay. It will print an Aging Report and a Cash Requirements Report.

Again, the journals, in this case Purchases and Cash Disbursements, may be customized by the user to spread transactions.

CASH DISBURSEMENTS JOURNAL
MARCH 1981

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

PAGE 1 OF 1

TR#	DATE	CHK. #	VENDOR/PAYEE	2030 ACCOUNTS	102, CASH IN B	5100 PURCHASES J	3040 ROBINSO	2040 LOAN PAYA	5110 LEGAL & A	5120 INTEREST	MISC	AMOUNT
1	03/21/81	1002	KANE PUBLISHING CO.	150.00	150.00	0.00	0.00	0.00	0.00	0.00		0.00
2	03/21/81	1003	*ACME BINDING CO.	0.00	250.00	0.00	0.00	0.00	0.00	0.00	5460	250.00
3	03/31/81	1004	BELLA KAY CORP.	525.00	525.00	0.00	0.00	0.00	0.00	0.00		0.00
4	03/31/81	1005	KANE PUBLISHING CO.	3100.00	3141.50	58.50	0.00	0.00	0.00	0.00		

RECAP OF CASH DISCURSEMENTS JOURNAL
MARCH 1981

A/C#	TITLE	DEBIT	CREDIT
2030	ACCOUNTS PAYABLE	3775.00	
1020	CASH IN BANK		3966.50
5100	PURCHASES DISCOUNTS		58.50
5460	BINDING EXPENSE	250.00	
	TOTAL >>	4025.00	4025.00

PURCHASES JOURNAL
MARCH 1981

A BUSINESS INC.
1234 ANY STREET
CENTRAL CITY, DC 90000

PAGE 1 OF 1

TR#	DATE	INV. #	VENDOR	2030 ACCOUNTS	5010 OFFICE SU	5020 RENT	5030 SHIPPING	5040 UTILITIES	5050 TELEPHONE	5060 OUTSIDE L	MISC	AMOUNT
1	03/10/81	1234	BELLA KAY CORP.	525.00	525.00	0.00	0.00	0.00	0.00	0.00		0.00
2	03/15/81	4456	CASABLANCA INC.	2027.00	0.00	1500.00	0.00	527.00	0.00	0.00		0.00
3	03/15/81	5678	KANE PUBLISHING CO.	1650.00	0.00	0.00	0.00	0.00	0.00	0.00	5450	1650.00
4	03/17/81	5671	CHICAGO PRODUCE CO.	150.00	0.00	0.00	0.00	0.00	0.00	0.00	5670	150.00
5	03/17/81	13435	KANE PUBLISHING CO.	1700.00	0.00	0.00	0.00	0.00	0.00	0.00	5450	1700.00
6	03/20/81	4356	THE BINE CORP.	450.00	0.00	0.00	0.00	0.00	0.00	450.00		0.00
7	03/31/81	66771	VALLEY INDUSTRIES	45.00	0.00	0.00	0.00	0.00	0.00	0.00	5675	45.00
8	03/31/81	100CM	KANE PUBLISHING CO.	100.00-	0.00	0.00	0.00	0.00	0.00	0.00	5450	100.00CR

RECAP OF PURCHASES JOURNAL
MARCH 1981

A/C#	TITLE	DEBIT	CREDIT
2030	ACCOUNTS PAYABLE		6447.00
5010	OFFICE SUPPLIES	525.00	
5020	RENT	1500.00	
5040	UTILITIES	527.00	
5060	OUTSIDE LABOR	450.00	
5450	PRINTING	3250.00	
5670	FOOD	150.00	
5675	RUBBISH REMOVAL	45.00	
	TOTAL >>	6447.00	6447.00

PAYROLL

Continental's Payroll module provides the user with an easy-to-use method of keeping track of employee records as required by federal, state and local law for all 50 states and the District of Columbia.

Complete Personnel Files are maintained for all employees.

A nice feature of this module is that the federal tax tables as well as the user's unemployment tax rate, FICA rate and limit and local payroll tax rates may be changed at any time by the user. When the payroll tax rates and/or limits change, most programs will not correct the previous amounts already deducted. This program will.

When it comes time to enter payroll data to generate checks, employees may be called up by name, pay period or department. The Payroll Journal may be printed totally, by pay period or by department.

When checks are printed, the employees' personnel files are automatically updated to reflect the current quarter and year-to-date totals.

Information for Form 941 and W-2 forms may be generated as well as Form DE-3 for California users.

A tax table update service is available for an additional charge of $50 per year. Continental will mail additional tax data disks as required to subscribers of this service along with a utility program that prompts the user as to how to update federal and/or state tax tables as needed.

Note: Continental Software has produced a set of audio tapes and a demonstration disk for its accounting modules. This demo package might be a good way for you to check out the suitability of these programs at a nominal cost.

A BUSINESS INC.
PAYROLL REGISTER
RECAP OF LEDGER ACCOUNTS
MARCH 11, 1981

A/C#	TITLE	DEBIT	CREDIT
5020	SALARIES	400.00	
5030	OVER TIME	500.00	
5050	BONUS	1000.00	
5060	COMMISSIONS	2000.00	
5070	HOLIDAY	100.00	
5100	PAYROLL TAXES	434.00	
2010	FICA EMPLOYEE		266.00
2020	FICA EMPLOYER		266.00
2040	FED INC TAX		1379.38
2060	STATE INC TAX		386.80
2070	SDI(STATE DIS INS)		24.00
2080	FUI(FED UNEMP INS)		28.00
2100	SUI(STATE UNEMP INS)		140.00
2090	INSURANCE		55.00
1020	PAYROLL CASH ACCNT		1888.82
	TOTAL >>	4434.00	4434.00

DAVID, JAMES SOC. SEC. # >> 111-11-1111 EMPLOYEE # >> 1
CHECK DATE >> 06/30/81 CHECK # 1087 PAID THRU >> 06/30/81

GROSS PAY	FED. W/H	STATE W/H	LOCAL W/H	F.I.C.A.	S.D.I.	NET PAY
1000.00	178.19	26.22	0.00	66.50	6.00	723.09
12522.80	2158.43	299.34	0.00	832.76	75.11	YEAR/DATE

GROSS PAY	AMOUNT	VOLUNTARY DEDUCTIONS TYPE	AMOUNT
SALARY	1000.00		

Checks-to-Go

Continental Software

We know small computers

CHECK NO 1087

DATE 06/30/81

AMOUNT $ *723.09****

PAY

VOID

CTGPR3

BPI GENERAL LEDGER

Company: Apple Computer
Language: Applesoft
Hardware Requirements: 48K, 2 Drives & Printer

Department: Business
Sugg. Retail: $395.00 (approx.)
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	**A**	DOCUMENTATION	**B+**	RELIABILITY	**A**
EASE OF USE	**A–**	VALUE FOR MONEY	**A–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**B–**	VISUAL APPEAL	**A–**		

The GENERAL LEDGER ACCOUNTING SYSTEM by BPI Systems Inc. of Austin, Texas is a complete accounting system for an Apple II 48K with ROM Card, two disk drives and a printer capable of printing at least 72 columns. The printer should be interfaced with either the Apple high-speed serial card or the Apple parallel printer interface card.

The package consists of four disks, including a very comprehensive manual which seems to take the first-time user through all the steps necessary to implement the system. The 4th disk (which is a data disk) has a sample business entered on it, allowing one to practice using the system. The three main disks are the Data Entry Disk, the Posting Disk and the Maintenance Disk.

The main feature of this program is the ability to run multiple commands with the use of automatic execution of the commands selected by use of a QUEUE. Every Data Disk that is used can only be entered by use of a special identifying code made up of six characters which allows the system to be used for numerous different companies just by changing the Data Disk and using the proper code to access it.

The system has a General Journal which can access any account in the General Ledger or in the subsidiary ledgers. Also of importance is the ease of correcting errors which are input. The back-space key will erase any error or the General Journal can be used by entering a journal entry with its matching offsetting entry to correct an entry made to the account after it was posted. This would work the same way a manual set of books would be kept.

Disk No. 1 — The Data Entry Disk has all the commands for entering data to the various journals in the system and the commands for printing the journals, posting the ledgers, preparing the financial statements and closing the books. With the use of the QUEUE commands all this is done automatically.

Disk No. 2 — The Posting Disk includes the commands necessary for posting all entries to the various ledgers after sorting them by account number. After the General Ledger is sorted, it printed automatically or shown on the screen if the printer has not been turned on. After the general ledger is printed, all subsidiary ledgers are also printed, which also includes the payroll ledger. The POST command can be executed any number of times during the month before the end-of-month command is run; a nice feature. A profit and loss statement can be generated at any time, as well as a balance sheet.

Disk No. 3 — The Maintenance Disk is used to open a new set of books and set up a new chart of accounts. When setting up the chart of accounts, changing the last digit of the account number will produce multiple profit and loss statements different departments, stores or branches. This disk is used to initialize the Data Disk which will be used for that particular operation. The Create Accounts command on this disk opens up a list of subcommands which allows the following. . .

Create general ledger
Create payroll ledger
Create accounts receivable ledger
Create accounts payable ledger
Create cash disbursement prompts
Create invoice register prompts
Create merchandise purchased journal prompts
Create cash journal prompts
Create store configuration

All in all, this is a very well thought out program, excellently documented and executed. No errors were found in testing the entire program. This General Ledger Accounting System is a complete, integrated system containing many superior features found only in very large computing systems. This is of use for any small or professional business. The system will handle up to 400 General Ledger Accounts, 100 payroll Accounts, 200 Accounts Payable Accounts, 500 Accounts Receivable Accounts (with a way to expand this) and 200 Cash Disbursement Accounts.

A CORNER GROCERY STORE
PROFIT AND LOSS STATEMENT
MARCH 31, 1980

	CURRENT	%	YEAR-TO-DATE	%
INCOME				
SALES-GROCERY	38,445.41	100.0	170,040.02	100.0
COST OF SALES				
COST OF SALES	26,332.16	68.5	118,711.58	69.8
GROSS PROFIT	12,113.25	31.5	51,328.44	30.2
EXPENSES				
SALARIES AND WAGES	2,844.40	7.4	14,992.95	8.8
FRANCHISE FEES	1,624.86	4.2	7,047.74	4.1
LAUNDRY AND UNIFORMS	0.00	0.0	25.40	0.0
CASH OVER/SHORT	<136.81>	<0.4>	<47.21>	<0.0>
RENT	1,500.00	3.9	7,500.00	4.4
UTILITIES	734.46	1.9	5,358.09	3.2
TELEPHONE	46.18	0.1	214.97	0.1
GARBAGE SERVICE	0.00	0.0	127.00	0.1
REPAIRS AND MAINTENANCE	81.73	0.2	374.06	0.2
PAYROLL TAXES	215.11	0.6	1,429.90	0.8
SUPPLIES	98.50	0.3	769.83	0.5
INTEREST EXPENSE	327.37	0.9	1,884.66	1.1
INSURANCE	386.00	1.0	1,158.86	0.7
LEGAL AND PROFESSIONAL	0.00	0.0	88.00	0.0
POSTAGE AND OFFICE SUPPLIES	1.50	0.0	3.16	0.0
MACHINERY AND EQUIP. RENTAL	0.00	0.0	15.84	0.0
HOSPITALIZATION INSURANCE	0.00	0.0	428.52	0.3
LOSSES ON BAD CHECKS	6.50	0.0	136.04	0.1
SECURITY SERVICE	27.00	0.1	135.00	0.1
DEPRECIATION	479.56	1.2	2,397.80	1.4
MISCELLANEOUS EXPENSE	9.50	0.0	21.50	0.0
TOTAL	8,245.94	21.4	43,974.11	25.9
PROFIT <LOSS>	3,867.31	10.1	7,354.33	4.3
OTHER INCOME				
GASOLINE COMMISSIONS	680.81	1.8	2,486.36	1.5
OTHER INCOME	43.25	0.1	217.35	0.1
TOTAL	724.06	1.9	2,703.71	1.6
NET PROFIT <LOSS>	4,591.37	11.9	10,058.04	5.9

A CORNER GROCERY STORE
CASH SALES JOURNAL

	03/25/80	03/26/80	03/27/80	03/28/80
INCOMING CASH				
SALES TAX	26.57-	28.90-	40.01-	32.31-
BOTTLE DEP. REC.	26.50-	28.20-	31.45-	29.15-
SALES-GROCERY	1,166.40-	1,129.84-	1,373.78-	1,247.40-
OTHER INCOME	8.37-	0.00	6.73-	0.00
OPENING CASH	361.21-	394.43-	503.34-	645.09-
CASH PAY OUTS & DEP.				
CASH PURCHASES	43.96	31.35	25.75	23.45
COUPONS REC.	0.40	0.10	2.17	0.00
MISCELL EXP.	0.00	0.00	0.00	0.00
CASH DEPOSITED	1,154.15	1,058.10	1,300.47	1,378.48
FOOD STAMPS DEP.	0.00	0.00	0.00	0.00
CLOSING CASH	394.43	503.34	645.09	549.82
CASH OVER/SHORT	3.89-	11.52-	18.17-	2.20
TOTALS	0.00	0.00	0.00	0.00

	03/29/80	03/30/80	03/31/80	TOTALS
INCOMING CASH				
SALES TAX	38.08-	26.95-	27.54-	919.49-
BOTTLE DEP. REC.	16.10-	27.85-	37.40-	785.30-
SALES-GROCERY	1,200.94-	1,158.44-	1,112.87-	36,246.45-
OTHER INCOME	0.00	0.00	0.00	1,208.69-
OPENING CASH	549.82-	517.77-	462.67-	14,109.45-
CASH PAY OUTS & DEP.				
CASH PURCHASES	23.90	139.79	12.36	1,395.75
COUPONS REC.	0.30	1.30	0.45	11.46
MISCELL EXP.	0.00	0.00	0.00	9.50
CASH DEPOSITED	1,256.30	1,120.41	1,000.00	37,675.28
FOOD STAMPS DEP.	0.00	0.00	0.00	88.00
CLOSING CASH	517.77	462.67	543.26	14,226.20
CASH OVER/SHORT	6.67	6.04	4.41	136.81-
TOTALS	0.00	0.00	0.00	0.00

AS OF
03/31/80

A CORNER GROCERY STORE
MERCHANDISE PURCHASED JOURNAL

DATE	VENDOR NO.	VENDOR NAME	INVOICE NUMBER	ACCT NUMBER	DETAIL	NET AMT
03/18/80	16	JIM'S SNACKS	1103	5011		26.88
03/19/80	13	CROWN BOTTLING CO.	33405	5011		401.20
03/21/80	4	SWANSON POTATO CHIPS	10303	5011		415.60
03/21/80	3	AMERICAN BISCUIT CO.	3088	5011		110.65
03/22/80	2	SAMSON SAUSAGE CO.	1480	5011		115.88
03/23/80	9	NATIONAL WINE CO.	5036	5011		133.37
03/24/80	14	TOP-FLITE MILK CO.	34310	5011		416.88
03/25/80	5	SUPER COLA BOTTLING C	11102	5011		223.86
03/25/80	1	AMALGAMATED PRODUCE C	6833	5011		141.68
03/26/80	15	WHOLESALE GROCERY CO.	35110	5011		1,169.81
03/27/80	8	MRS. SMITH'S BAKERIES	36550	5011		99.58
03/28/80	16	JIM'S SNACKS	1226	5011		19.99
03/29/80	10	NATU-WHEAT BREAD CO.	37922	5011		69.81
03/30/80	5	SUPER COLA BOTTLING C	11623	5011		291.48
		TOTAL CREDIT PURCHASES				9,924.20

AS OF
03/31/80

A CORNER GROCERY STORE
CASH RECEIPTS JOURNAL

DATE	CUST. NUMBER	CUSTOMER NAME	DETAIL	NET AMOUNT
03/01/80	16	RAY, WILLIAM H.	52.18	
	9	BROWN, CHARLES	19.80	71.98
03/03/80	4	HUNTER, THOMAS	22.80	
	19	NOLEN, A. B.	89.20	112.00
03/06/80	13	HORNSBY, MICHAEL	189.65	
	22	WATKINS, DOROTHY	100.00	
	15	YOUNG, WILLIAM	46.27	335.92
03/09/80	5	MOODY, CYNTHIA	110.16	
	25	PARKER, JAMES	96.31	
	27	MOODY, JOHN	110.21	
	28	MONROE, KEN	60.00	376.68
03/12/80	1	GUZMAN, ARNOLD	98.62	
	20	HOWARD, WILLIAM H.	101.60	200.22
03/14/80	6	MONTGOMERY, DARRELL	167.50	
	3	FOSTER, JOE T.	119.68	287.18
03/18/80	23	SILLS, FRANK	10.66	
	24	READ, TONY	81.60	
	26	MYERS, JERRY	44.80	137.06
03/22/80	7	OGELSBY, W. H.		88.60
03/25/80	8	COLLIER, A. W.	101.89	
	2	FOSBECK, DONALD G.	67.22	
	10	HACKETT, ARNOLD	106.82	275.93
03/29/80	11	NUNN, ALTON B.	121.20	
	12	CASTLEBERRY, RAYMOND	206.20	
	17	PERRY, ALEXANDER	175.10	
	21	CURTIS, JOHN	133.34	635.84
		TOTAL		2,521.41

AS OF
03/31/80

A CORNER GROCERY STORE
CASH DISBURSEMENTS

DATE	PAYEE	CHECK NUMBER	ACCT NO.	SUB ACCT NO.	DETAIL	NET AMT.
			6641		28.40	141.09
03/28/80	ACME PEST CONTROL	526	6601			10.00
03/28/80	WATSON DISTRIBUTING CO.	527	5011			157.70
03/29/80	NATU-WHEAT BREAD CO.	528	2010	10		67.50
03/29/80	SUPER SECURITY SERVICE	529	6771			27.00
03/29/80	WHOLESALE GROCERY CO.	530	5011			890.81
03/29/80	FIRST NATIONAL BANK	531	2620		1,074.69	
			1830		241.30-	
			6641		241.30	1,074.69
03/29/80	NATU-WHEAT BREAD CO.	532	2010	10		45.86
03/29/80	CENTRAL FOOD MARTS	533	6531			327.70
03/29/80	WATSON DISTRIBUTING CO.	534	5011			63.60
03/29/80	WHOLESALE BEER DIST. CO.	535	5011			145.50
03/29/80	PUBLIC SERVICE BOARD	536	6571			729.76
03/29/80	STATE WIDE DISTRIBUTING C	537	5011			90.80
03/31/80	STATE WIDE DISTRIBUTING C	538	5011			23.75
	TOTAL					33,767.45

BPI ACCOUNTS RECEIVABLE

Company: Apple Computer
Language: Applesoft
Hardware Requirements: 48K, 2 Drives, & Printer

Department: Business
Sugg. Retail: $395.00
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A–	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B–	VISUAL APPEAL	A–		

ACCOUNTS RECEIVABLE by BPI Systems Inc. is a computerized receivables program for the small business. The equipment necessary to operate this system is an Apple II with 48K, two Disk Drives and a printer capable of at least 72 columns. Unfortunately, the program seems to be written for a Centronics Printer, although it is not specified in the Equipment Required List; since my printer is a Paper Tiger, the hard-copy listings could not be produced at all.

The program consists of actually three disks: 1) a Data Entry Disk, 2) a Reports Disk, and 3, a Maintenance Disk. There is also a fourth Disk which contains a complete set of accounts with balances forward for use in practicing entries.

The system comes with a device that must be plugged into the game paddle I/O socket for running the programs. Without this device, a very nasty thing happens. The data disk in drive two gets completely erased as the disk is initialized resulting in the program on the disk in drive 1 being deleted when NEW is invoked by the system.

ACCOUNTS RECEIVABLE is a complete, almost automatic command execution system for this type of data entry. Almost all commands are issued so that as many as eight different commands can be executed in sequence without user input. Included is an Invoice Register, Cash Receipts Journal, and General Journal, which has a skeleton General Ledger that can be tied into the General Ledger System (also by BPI). After posting to the skeleton General Ledger, all accounts can be transferred to the BPI General Ledger System automatically.

The Reports Disk #2 prints up to 16 different reports at the user's option any time during the accounting month. The only item that it will not print are invoices; however, since this is not a billing program, this option was not included. Statements are printed in one of two ways; either with balance forward or with open items. The choice is left to the user when the system is generated.

The maintenance Disk No. 3 sets up all the necessary accounts on the data disk, including creating the skeleton General Ledger. In essence, this system can handle about 500 accounts and 1,000 transactions per month without too much trouble. If a data disk becomes full during the month, instructions are displayed on the screen for creating two or more disks to handle the volume.

The manual included in this system is well written and seems to cover almost every phase necessary to get the package up and running without too much trouble. One important feature incorporated in the entry routines allows the user to correct any type of error entered just by using the back-space key.

This is a well-designed receivables application for the Apple, though not inexpensive. Also, most people do require a billing program in order to produce invoices that tie into a receivables program. It would be preferable if such an option were available for this system.

PAYROLL

Company: Broderbund
Language: Pascal
Hardware Requirements: Apple II or II + Disk

Department: *Business*
Sugg. Retail: $395.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**A –**	DOCUMENTATION	**A –**	RELIABILITY	**A**
EASE OF USE	**B +**	VALUE FOR MONEY	**A –**	ERROR HANDLING	**A**
VENDOR SUPPORT	**B +**	VISUAL APPEAL	**A**		

PAYROLL by Broderbund Software is a complete payroll program in run-time Pascal for an Apple II or an Apple II Plus with 48K of memory and DOS 3.3. The system uses two disk drives and a printer with at least 96 columns of print per line. This program will work with almost any printer, including the Epson MX-80 and the Centronics 737. The payroll system will handle the tax computations for all 50 states, including Washington D.C. and almost all local municipal governments in the United States. The system can accommodate up to 15 divisions with about 300 employees per year and 245 employees per pay period. There are five miscellaneous deduction types on the average for each employee per year, with up to 30 deduction types which can be defined as needed. This allows any employee to have any mix of the 30 as required. The pay types can include any combination of wage rate, piece rate, salary, commission, bonus, etc. Four of the pay types can be changed to suit the user. Each may be taxed or non-taxed.

There are five disks supplied with the package and all disks are copyable with the DOS 3.3 System Master copy program. Sixteen top quality blank disks are recommended to start using the program, as a poor quality disk can cause serious problems with the stored data. The programs' disks are:

1. PROGRAM ONE
2. PROGRAM TWO
3. COMPUTE
4. DATA
5. ADDRESS

There is a practice session included on the Data disk so that the new user can change all the variables, enter some practice employees, change the supplied information and really get some hands-on experience in using this very versatile program. All menu functions of this payroll program are protected by a password so that no unauthorized person can access or alter any of vital payroll information. Furthermore, no checks can be printed without the proper passwords, since all menus are controlled by the password.

Program One consists of the following functions:

1. Add or terminate employee
2. Enter payroll information
3. Print detail listing
4. Compute payroll
5. Print check register
6. Print checks
7. Enter hand or void checks
8. Print employee lists
9. Look at/modify current pay records

Program Two contains these other functions:

10. Print summary reports
11. Print quarterly reports
12. Look at/modify master pay records
13. Print ethnic distribution
14. Print W-2 forms
15. Change variable/passwords
16. Year-end master file cleanup
17. File reconfiguration

Employee addresses are recorded on the Address disk if the user opted for address recording; otherwise, the address disk is not used. The computer disk does all the necessary computing of the payroll and the resulting information, including the employee information which is stored on the Data disk. All parts of the program are nicely error-protected and full prompting is given on the screen so that one can learn how to use all parts of the module very easily. The documentation is very easy to use and is logically indexed by numeric references so that any part can be found easily. This is a very well thought-out payroll program and should give very little trouble to the potential user with the only drawback being that there has to be a yearly update for the registered user at a nominal charge. Broderbund's charge for the 1980-81 update is twenty dollars.

PEACHTREE 140 PAYROLL SYSTEM

Company: Retail Sciences
Language: MBasic
Hardware Requirements: 48K & Language card, Z-80 card 2 Disk-Drives & Printer

Department: Business
Sugg. Retail: $395.00 (approx.)
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	A –	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B –	VISUAL APPEAL	A		

PEACHTREE PAYROLL SYSTEM by Retail Sciences Inc. is an Automated Payroll and Financial Reporting System for an Apple II Plus, 48K, two Disk drives, a printer capable of at least 132 columns, a Language card, a Z80 Softcard by Microsoft Consumer Products with CP/M and Microsoft Basic on Diskette. The programs supplied consist of three disks, two of which are program disks and the third a data disk.

Before this program can be run, the user must load CP/M and Microsoft Basic into the machine. The computer should be booted with the Microsoft Disk which loads the CP/M; when the prompt appears, Basic should be loaded after which the "PR MENU" is run to start the program. Care must be taken in following each step as outlined in the manual, since the program is very prone to BDOS ERRORS. The file maintenance and list functions reside on the first disk with the month end, quarter end, year end and tax maintenance modules located on the second disk.

The federal withholding taxes are supplied on disk; however, the state withholding taxes have to be filled in by the user. In entering the data for California, this reviewer found it difficult to make the deduction come out very accurately although I tried at least 10 different times. Also, the user has to go into the main program to change the state disability figures, as no way was provided to input that information.

The data disk contains a sample file for a fictitious company which, when run, helps the user get acquainted with the way the program operates. After a copy is made of the original data disk, the copy is used to create the employee file by using system startup, which allows the user to input his or her company name and various sundry information relevant to the payroll program after which a new employee file is created, consequently deleting the sample file on the data disk. The programs are menu-driven and are easy to run.

A check register can be printed before the checks are written so that all figures can be checked beforehand. Even if the checks are incorrectly printed, the figures can still be changed and the checks rewritten correctly, provided the entries were not posted, referred to as new period initialization by this program. Another feature of this program is that it will set up a general ledger transfer file if the Peachtree General Ledger System is being used. The data disk will hold approximately 250 employees which is about maximum for the 5 1/4 in. disk. All input data can be easily edited. The program handles five different pay periods and will print checks for any number of different pay periods.

Once the procedures of this program are mastered, the user should not have too much trouble in speedily running and printing his entire payroll. Month-end processing prints the schedules for the tax returns as does the quarterly which prints out all necessary information. At year-end, the W2's are output on the pre-printed forms, with formatting that provides proper alignment of figures.

In sum, this is a good payroll package, but it does require expensive additional hardware.

LEGAL ACCOUNTING

Company: FCI Inc.
Language: Applesoft
Hardware Requirements: 48K, Dual Disks

Department: Business
Sugg. Retail: $1200.00
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	B –	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B –	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	C +	VISUAL APPEAL	B		

The LEGAL ACCOUNTING PROGRAM #1 by Clarence B. Ziegler, Jr. is for use on Apple II 48K with two Disk Drives and serial or parallel Centronics Printer, Spinterm or Diablo Printer. If there are one or two lawyers in the firm use a Centronics #779, three to five lawyers, use #702 and six to eight lawyers use the #703. The program can handle a maximum of eight attorneys in a firm with up to 1200 active cases. The program consists of three disks. . . The main program disk, a details disk and a case disk. The details disk contains information concerning the lawyer performing the service, the hours and rates, and a description of the service. The cases disk or customer disk contains the file number, date, class, description and billing code.

Each case disk can holdup to 350 cases and the details disk can hold 800 details. This program is very sophisticated and should be used by a bookkeeper who is familiar with legal terminology. The details and case disks are generated from the main program disk by using item #2 in the menu, the RUN TRIAL BALANCE. This initializes and formats each disk and assigns sequential numbers to each group of disks.

The various programs are menu-driven, with the Change Lawyers and Clerks Names options allowing the user to alter all names. There is room for eight lawyers and up to fifty lines for clerks or para-legal names. The program also has the option of selecting peripheral parameters so information can be input for use of the printer. When the program is first run after the details and case disks are initialized, the first items to be entered are a new case and a number is assigned to it. After that, the computer prompts for all necessary information that is needed. If all is correct, the input is then stored to the disk.

Service codes are preassigned by the program and are very detailed and self-prompting. There is also a code 14 for unbillable time and room for remarks which are for internal use only, such as "this guy is a rich jerk," etc. Service code 15 records payments made to the account with balance-to-date amounts. The program also allows a printout of a case history and a customer statement. These statements can be printed in groups or singly. Before anything is printed it can be reviewed on the screen and updated or corrected if wrong with the correction part of the program.

A case can be deactivated if it is no longer needed, with the balance-to-date zeroed out. This case is then held on the disk until the end of the month is run before it is dropped. An important reminder is that this program is also an accounting program; it prints a trial balance, creates new disks and runs end-of-month so that the firm can start fresh each month. The program stores the ending balances on the new disk and deletes all the inactive cases.

The following are the codes and classifications that this reviewer thinks should be of interest in anyone contemplating purchase of this program.

CODES

CLASS NUMBER	DESCRIPTION
10	Subrogation—Plaintiff
Negligence	
11	Subrogation
20	Insurance—Defense
21	Insurance—Negligence
22	Insurance—Workman's Compensation
23	Insurance—Malpractice
24	Insurance—Product
Liability	
25	Insurance—Other
30	Real Estate
40	Divorce
50	Criminal
51	Criminal Appointment
60	Wills
70	Estate Planning
80	Probate—General
81	Probate—Juvenile
82	Probate—Juvenile
Appointment	
90	Corporation
100	Bankruptcy
110	Miscellaneous

Any class description can be changed or added. Also there are 15 service codes and 12 billing codes. Service codes can be changed but the codes 11 through 15 are needed by the program and cannot be altered.

THE CONTROLLER

Company: Dakin5
Language: Applesoft
Hardware Requirements: 48K, 2 Drives & Printer

Department: Business
Sugg. Retail: $695
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	A	RELIABILITY	A+
EASE OF USE	B+	VALUE FOR MONEY	B	ERROR HANDLING	A+
VENDOR SUPPORT	B	VISUAL APPEAL	A		

THE CONTROLLER by Dakin5 Corporation and Apple Computer Inc. is a series of computer programs consisting of Accounts Receivable, Accounts Payable and General Ledger for the Apple II. The programs can be used either separately or together.

The equipment necessary to operate THE CONTROLLER is an Apple II, 48K or Apple II Plus, 48K system with two disk drives, one controller card, a video monitor or TV set with modulator, a printer capable of at least 96 columns with eight lines per inch, and Applesoft in firmware (or a language card if the hardware is not an Apple II Plus).

The programs are all operated by means of menu choices which allow the user to tailor each program to his business. Planning cash flow and keeping track of slow-paying customers is very easy, using these programs. All bookkeeping is done by THE CONTROLLER's automatic posting routines. THE CONTROLLER provides all necessary printed management summaries, detailed reports, vendor and customer lists, mailing labels and account statements. The Balance Sheets or the Profit and Loss Statements are provided either in summary form or detail. All accounting is regulated and standardized so that it is virtually impossible to make any errors.

The manual provided with THE CONTROLLER is sufficiently concise and detailed enough so that the user will have no trouble in using this system. The documentation provides instruction on how to use the system and is also organized so that it will serve as a reference manual once the user starts operating the system. Additionally, the manual describes in detail how to set up the system and the sequences required to begin using THE CONTROLLER.

All reports that are generated by the programs are included in the manual, with samples and complete descriptions. All three systems should be used with practice examples before attempting to enter the user's business data into the system. The documentation is excellent and easily followed with very little trouble.

The accounts receivable (A/R) system can handle up to 250 customers per disk with a maximum of 1000 transactions for all customers. It is possible to use up to nine disk volumes; however, only three are suggested. The one big drawback with the A/R package is that the maximum sale can only be $99,999.99 and the maximum sales tax can only be $999.99. This also means that the largest single A/R balance for any one customer can only be $99,999.99 per aging period. The largest overall balance allowed per customer is only $399,999.96. This should be carefully noted, since this would be a significant limitation for any business that deals in large amounts of money.

The Accounts Payable (A/P) system can handle up to 125 vendors at any one time, although the total for all A/P transaction amounts cannot be more than $99,999,999.99 for any one month. This should not place any restriction on the potential user other than both having a maximum of 300 checks that can be printed and 300 invoices can be processed each month in batches of 100 invoices each.

The General Ledger (G/L) can handle up to 250 accounts with a maximum of $99,999,999.99 per account balance. The chart of accounts that is supplied with the system is very broad and covers all areas, but its capability for customization to suit the user or for creating a completely new chart of accounts can be implemented at the start-up of the G/L. The chart of accounts can be divided into a maximum of up to 10 different departments if needed by the user. The system can handle up to 1000 journal entries which include 100 standard entries each month. The user can not have more than 1000 entries in the system at any one time, whether they are for the current month or for future months. (This is a file limitation that should prove to be no trouble to the potential user.)

The system will automate many time-consuming tasks by providing very fast access to data and reporting procedures, with a large reduction in accounting fees and bookkeeping procedures. All of the programs are protected from user error as much as possible, since back-up disks are forced to be made before one can keep advancing through the programs. The programs consist of seven system disks, three data disks, 10 backup disks, and four blank disks. An additional supply of disks are needed for backup copies of the system disks and data disks.

	Allowed	Recommended
A/R transactions per month per disk	1000	750
G/L transactions per month	1000	750
G/L journal entries per month	1000	700
G/L batch entries	250	100

In actual use, the programs are not too swift, as there is endless swapping of disks for backup purposes and different system disks are needed. The programs issues prompts for the proper disk and will not accept any other disk, which is sound practice from an error prevention standpoint; however, if disk SYS002 is needed, one must first insert disk SYS001 and then disk SYS002. Additionally, when a choice is given for a summary or detail report, one must print the P/L, Balance Sheet and Trial Balance deposit reports or the program will not allow the month to close if only Summary reports are printed. This is a drawback, if throughput speed is essential and the detail reports are not needed. The report printing procedure also uses quite a bit of paper since, as each report is finished, the top of form feed is executed twice resulting in an unused sheet being provided between each report. This makes for bulk if each month is kept in a complete set without separating the monthly reports.

ANALYZER

Company: Dakin5
Language: Applesoft
Hardware Requirements: 48K, 2 Drives, Printer

Department: Business
Sugg. Retail: $625.00
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A–	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

The ANALYZER by Dakin5 is a series of programs designed to function in conjunction with The Controller for evaluating, assembling and distributing monthly information produced by The Controller. The user must be running under Version 1.1 (Dos 3.3) for the Apple II or Apple II Plus, with the same hardware requirements. The ANALYZER interfaces with the Controller so that information generated by the Controller is transferred on a monthly cycle (or optionally, at start up, then monthly).

The ANALYZER operates in the same manner as the Controller and is completely menu-driven. The documentation is very complete and concise, with very little in the area of procedure being left to chance. The program produces a budget (either temporary or permanent), which is applied to the revenue and expense accounts, followed by projected goals and variances.

The profit-and-loss analysis compares the amounts for the current year against the previous year on a monthly, quarterly or year-to-date basis and will produce appropriate reports by departments, if specified by the user, for the Controller. The Balance Sheet analysis uses the total assets as its source for producing two different types of reports. One shows the dollar variances by comparing last year with the current year; the other report gives the percentages of the different assets, liabilities and equities for both years in relation to the total assets.

The sources and application of funds reports summarizes the transactions that have caused balance sheet changes between the two years. A financial ratio analysis report is generated, which shows the company's ability to meet short term obligations, how much is financed by debt and how effectively the assets are being used. The cash flow projection report supplies the data needed to plan a sound cash budget and at the same time advises on what the monthly cash requirements will be for the current month and three future months.

After booting the ANALYZER, the program takes the user through the types of procedures that were used for the Controller, with all the identical customizing features that were needed for tailoring the program to the user's business needs. The chart of accounts can handle up to 500 categories, including all current accounts and any accounts from the previous year having a balance. The ANALYZER-produced accounts are closed every month (the same as "Controller") in addition to being closed quarterly, so that an archive disk can be generated.

The ANALYZER comes with three system disks, one data disk and three backup program disks. Additionally, the G/L archive disks and the DAT006 from A/R and DATO11 from A/P are needed to generate the various reports. If the Controller is Version 1.0, then the archive disks will have to be converted in order to use them. When the ANALYZER is started up, the program interfaces with the Controller MST001 disk so that the ANALYZER is incorporated into the Master disk. The programs are well protected; there is error trapping throughout. For example, if a wrong disk is inserted in a drive, the system asks for the proper one. To operate properly, it is necessary to transfer 13 months of General Ledger information from the Controller to the analyzer disks. This should be done during startup, because the reports need 13 months for a year-to-date comparison and, if done during startup, it processes the reports much faster. All procedures are clearly outlined in the manual and the screen-prompting is more than adequate.

The programs are relatively easy to use once one gets oriented to the requirements and the lengthy time-consuming startup procedure is overcome. The results of the various reports more than make up for the extra effort. The manual provided comes with samples of all reports. This package can be very useful for a small business' financial requirements, provided the user has all the necessary backup information as provided by the Controller; without this output, the ANALYZER is of little use.

A 01425.1 B DAKINS CORP. BUDGET ANALYSIS REPORT C FOR MONTH ENDING 01/31/80 D DATE 01/31/80 PAGE 1 E

F ACCT NO	G ACCOUNT DESCRIPTION	CURRENT MONTH ACTUAL (H)	CURRENT MONTH BUDGETED (I)	CURRENT MONTH VARIANCE (J)	YEAR-TO-DATE ACTUAL (H)	YEAR-TO-DATE BUDGETED (I)	YEAR-TO-DATE VARIANCE (J)
	SALES						
40110	RUYALITIES INCOME	102.724	100.000	2.724	102.724	100.000	2.724
40111	DIRECT SALES INCOME	13.496	10.000	3.496	13.496	10.000	3.496
40112	SALES TRAINING - SEMINARS	0	0	0	0	0	0
40210	MISCELLANEOUS INCOME	34	50	16-	34	50	16-
40211	COD & FREIGHT OUT BILLED	201	200	1	201	200	1
40212	MARKETING SERVICES	0	0	0	0	0	0
42110	SALES/TERMS DISCOUNTS	0	0	0	0	0	0
42111	SALES/TERMS DISCOUNTS	0	0	0	0	0	0
42210	SALES - RETURN/ALLOWANCE	428-	0	428-	428-	0	428-
42211	SALES - RETURN/ALLOWANCE	0	0	0	0	0	0
	TOTAL SALES	116.027	110.250	5.777 5.2% K	116.027	110.250	5.777 5.2% K
	COST OF SALES						
45111	INVENTORY - NOVEMBER 1	0	0	0	0	0	0
45211	PURCHASES - MERCHANDISE	3.922	5.000	1.078-	3.922	5.000	1.078-

A 01407.1 B DAKINS CORP. PROFIT AND LOSS ANALYSIS - COMMON SIZE C E FOR MONTH ENDING 01/31/80 D DATE 01/31/80 PAGE 1

		F YEAR-TO-DATE THIS YEAR	F YEAR-TO-DATE LAST YEAR	G PERCENTAGE OF REVENUES THIS YEAR	G PERCENTAGE OF REVENUES LAST YEAR
H	SALES				
40000	SALES MERCHANDISE	29,758	21,111	98.8%	99.3%
40010	SALES REVENUE	134	102	.4%	.5%
40101	SALES RETURNS	0	0	.0%	.0%
43999	SALES OTHER	97	22	.3%	.1%
	TOTAL SALES	29,989	21,235	99.5%	99.9%
	COST OF SALES				
44000	BEGINNING INVENTORY	4,444	0	14.8%	.0%
44100	PURCHASES	10,000	5,556	33.2%	26.1%
44201	PURCHASE RETURNS	0	0	.0%	.0%
46999	ENDING INVENTORY	5,000	4,444	16.6%	20.9%
	TOTAL COST OF SALES	19,444	10,000	64.6%	47.0%
	GROSS PROFIT/LOSS ON SALES	10,545	11,235	34.9%	52.9%
	OPERATING EXPENSES				
50000	RENT EXPENSE	100	100	.3%	.5%
50010	TELEPHONE	122	51	.4%	.2%
59999	UTILITIES EXPENSE	211	110	.7%	.5%
	TOTAL OPERATING EXPENSES	433	261	1.4%	1.2%
	NET OPERATING INCOME	10,112	10,974	33.5%	51.7%
	OTHER REVENUE				
47000	FINANCE CHARGES	124	24	.4%	.1%
49999	VENDOR DISCOUNTS TAKEN	0	0	.0%	.0%
	TOTAL OTHER REVENUE	124	24	.4%	.1%
	OTHER EXPENSES				
60000	INTEREST EXPENSE	150	100	.5%	.1%
60010	OTHER EXPENSE	0	0	.0%	.0%
69999	TAXES	178	101	.6%	.5%

CLIENT BILLING SYSTEM

Company: High Technology Inc.
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $100.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	B		

CLIENT BILLING SYSTEM by High Technology Inc. is a system for billing and keeping track of client transactions for the small business man, lawyer, C.P.A. or anybody involved in billing requirements on an hourly basis, as applied to an employee or through a fixed rate charge per service unit. The system is capable of accepting up to five hundred different rates. An Apple II 48K with ROM Applesoft, one or two disk drives and a printer capable of 132 characters per line is necessary for the operation of this system.

The disk that comes with this package includes a program on it to set up system parameters for specifying the user's hardware. The operating manual that comes with the system is short and concise but adequate to get the user properly started. There are two files consisting of the rates file, which must be set up first to establish all rates that would be charged, and the hours file, to which the hourly billing information is input. All other files are listed to the printer. The following constitute the programs on the disk, which are accessed by means of a menu:

Rates
Hours
Job Cost Analysis
Rates Journal
Hours Journal
Payment Journal
Expense Journal
Raw Journal
Statements
Trans. Analysis
Create Balfwd.

The HOURS file can handle five different transactions which include, besides the hourly rate, E for expense, P for payment received, BID for bid or job estimate, and B for initial balance. When any of the available journals are listed to the printer, all transactions are completely totalled. The one element missing in the statements is the client's address, as the program only asks for the client's or customer's name.

This is a relatively simple package in terms of user friendliness if one follows the directions in the manual. This system should provide the user with a means of easily keeping track of expenses, payments and charges (hourly or job-rated) involving his customers or clients.

THE INVOICE FACTORY

Company: Micro Lab
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $200.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	B–	RELIABILITY	B+
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B+
VENDOR SUPPORT	B	VISUAL APPEAL	B		

THE INVOICE FACTORY by Micro Lab is designed as both a stand-alone program and one to be used in conjunction with The Data Factory. It provides the user with a tool whereby invoices and statements can be prepared and each customer's account can be kept track of.

The name of the program implies that it is to be used in the preparation of invoices. While this is true, it is much more than that. It will print invoices, monthly statements, plus maintain and update each customer record and his/her present balance.

It is, however, a specialized program designed for a company that deals with "hard" goods that can be identified and priced by item listings. A company that deals in services or soft goods would not find it applicable to their operation.

Like the Data Factory, the Invoice Factory is menu-driven and easy to use. The user starts by entering Master Accounts, or a list of all of their customers into the system. The format that must be used is well laid out and defined with enough information provided so as to make this portion of the task easy to do.

Next is the preparation of the "shipping variables". This portion of the program can save a company hours of manual calculations because it allows the computer to figure the shipping costs based on a product's weight and the Zip Code destination. UPS charges can be updated as their rates change. We found this section to be totally accurate in every respect.

After the shipping variables are entered, it is necessary to enter the product information, including a description, price, and shipping weight. The system allows use of up to 100 products; when choosing which ones to use, the arrow keys control the scrolling of the list on the screen.

After the user has established a master accounts file, a shipping information file, and a product price and weight file, one is ready to print out the invoices. This procedure is easily accomplished by following the instructions in the book; they have even provided a "set-up" routine to allow you to line up the invoices in the printer prior to running them.

Of more importance to the user than the simple printing of an invoice is the ability of the program to provide statements, accept payment posting, issue credit memos, and print reports. In other words, the system is a complete office billing package designed for small businesses who sell "hard" products. It can handle all phases of the billing cycle and keep track of each customer.

There are several negative aspects that we discovered in using this program. The first is that you must use invoices that are preprinted with your company name and address or else use a rubber stamp on them. While this is not a major problem, it would be nice to be able to have the program print company information on the invoice. Also, since the computer numbers the invoice (after you specify where to start), invoices with preprinted numbers on them cannot be used. This latter problem is of more concern from a security stand-point than anything else. We do not know how many companies want to have unnumbered invoices around which could be used by others.

The last thing that we feel should have been included is a comment line on the invoice itself. In the preparation of an invoice, it is oftentimes nice to be able to add a comment, refer to special sale, or just say thank you to your customers. Computer systems have already taken most of the personalisation out of the world; it would be nice to be able to add this type of comment feature to an invoice.

It is possible to use the files created by the Invoice Factory for use with the Data Factory. A conversion program is included that allows the user to add to the file information, change the fields around and otherwise customize them for their own use.

We discovered that going from Data Factory to the Invoice Factory and back again was awkward at best and, unless care is taken, file damage can occur.

THE FINANCIAL PARTNER

Company: Denver Software Co.
Language: Runtime Pascal
Hardware Requirements: 48K Apple II/II +, 80-col. printer

Department: Business
Sugg. Retail: $249.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	A –	RELIABILITY	A –
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B +
VENDOR SUPPORT	B +	VISUAL APPEAL	B +		

The Financial Partner is a bookkeeping and accounting program for households or *very* small businesses. The program consists of three disks and well done documentation. Included are samples of checks and 100 sheets of printer paper. In addition to the standard Apple II/II +, an optional printer capable of 80 columns is necessary to make full use of the program; and two disk drives makes for less disk swapping. The program, which is in run-time Pascal, will not run with a Smarterm 80 column board (so I doubt if it will work with any eighty column board, but I had no way of checking). I had to disconnect the Smarterm in order to review this program. The manual begins by outlining some of the basics of accounting, which should be helpful for some people who lack this experience.

The Financial Partner supplies a complete Chart of Accounts. This chart can be modified by either adding or deleting accounts in order to tailor the chart to whatever the user desires. The program produces the standard reports that you would expect from a General Ledger type of program, including: a Balance Sheet, Income Statement, Check Register, and Period-to-Date Reports. The Chart of Accounts can hold up to 150 accounts, and displays a warning when 90% is reached. The program allows the user to input up to 100 checks in the register and up to 75 vendors; and it allows you to print checks. The system adds decimal points and commas to all dollar amounts so that these figures can be easily entered. But if a balanced input is not entered, the user cannot proceed until the debits and credits are balanced (warning and error messages are supplied on-screen).

Disk interaction in this program is somewhat slow. A more serious limitation, in terms of its features, is that it does not allow the user to run Aging Reports of receivables, necessary to so many businesses. As home/small business accounting packages go, *The Financial Partner* may be worth a look. But its price seems a little high in weighing the program's capabilities against the features of competitors in the same price range.

WORD PROCESSING

In order to choose intelligently word processing software for a micro-computer, the prospective buyer should have a good understanding of the concept of word processing, and an idea of what features can go into a word processing system. In many cases, your own word processing needs will determine which features are more important to you, making it imperative to know what you are buying before you invest in a product.

A word processing system can be defined to be a program or collection of programs which are designed to allow a computer user to enter and edit textual matter, stored within the memory of the computer or on some external media (e.g., diskettes), for the purpose of ultimately producing a typewritten document. Word processing's advantages over the lowly typewriter are beginning to make themselves felt in all areas of text handling both in business and in the home. By entering a business letter with a word processor, it is possible to quickly correct minor mistakes, move words, lines, or entire paragraphs around, and perform complicated formatting tasks, without the necessity for hand retyping of each revision.

A typical word processor consists of three major components:

- an editor
- a file manager
- a formatter

Each of these will be discussed separately in the sections to follow, although they may all be parts of a single large program.

THE EDITOR

The editor is perhaps the most important part of a word processing system. It is the editor which provides the primary interface to the user, allowing him to type in text and modify it as needed. A good editor can make word processing effortless, a bad one can make it almost more difficult than using a typewriter. Most micro based editors operate upon a collection of text, held in the memory of the machine, and allow the user to display sections of the text on a terminal, add or insert additional text, change, delete, copy, or move existing text, and scan for selected strings.

There are two major classes of editors: the line oriented editors and the full screen type. Attached to early computers one would always find the popular teletype terminal. This device was essentially a computer driven typewriter, printing messages from the computer on a roll of paper and accepting input from a keyboard. Based upon this device, early editors were line oriented; in other words, input from the user was accepted in the form of a series of lines, each ended by pressing the carriage return key. When the user was not typing input, the computer could send output, also in the form of lines. A line oriented editor is generally command driven, allowing a user to instruct the computer to accept input lines of text, list selected lines as output, delete lines, substitute strings, and scan. The advantages of such an editor are that it can run on almost any terminal, hardcopy or video, and, being command driven, it is somewhat easier to learn to use. The disadvantages are that it is at times hard to find one's place in the text being edited, making changes can be awkward, and lines must constantly be listed so that the user is aware of the changes he has made.

Full screen editors, on the other hand, were based upon the video or CRT terminal. A video terminal allows several lines to be displayed upon a TV-like screen, and, depending upon the terminal, these can be selectively erased or rewritten by the computer, not necessarily in the order that they were originally written. This design allows a full screen editor to "throw" a large number of lines of text up on the screen and through the use of a cursor and cursor movement keys, the user can move around on the screen making changes in the text. Add to this capability special editing commands (usually invoked with control characters), and a very powerful editor is the result.

Many word processing editors are available for micros today, employing both the line and the full screen orientations. In addition there are editors which fall somewhere in between (let's call them command driven screen editors) which are line oriented editors in every sense except that a portion of the screen is set aside to display an updated image of the text after each command. For the purposes of this discussion, though, they may be considered line oriented.

LINE ORIENTED EDITORS

There are several commands one expects to find in a good line oriented editor. Line oriented editors allow the user to refer to a line by either a numbering scheme (such as the BASIC editor) or by a "current line pointer" concept. In the first case, should a user want to list the first twenty lines of text in his document, he might say "LIST 1,20" or list lines 1 through 20. In the second case he would position an imaginary current line pointer to the top of the document (with a TOP command) and then he might issue the command "LIST 20" or list the current line and the lines following up to 20 lines. There is usually a line adding command which, when invoked, allows the user to enter lines of text automatically, one after another. Also, there are commands to delete a line or a range of lines and insert lines

(similar to the adding command) between other lines. To facilitate finding a line which needs changing, there should be a scan command which searches the document for a given string, and, once found, a string substitution command, to allow minor changes to a line to avoid retyping it.

In addition to these basic commands, there are several possibilities. A very useful feature is the ability to globally change a given string to another. Suppose you have entered a form letter written to a Mr. Lee. Now you want to send the same letter to Mr. Green but Mr. Lee's name appears all throughout the letter. A global replace command would change all occurrances of the string "Mr. Lee" for "Mr. Green", shifting the remaining text on each line to the right to make space for the longer name.

Another useful command is one which permits copying of a line or group of lines from one place in the document to another. This is done, usually, by specifying the starting and ending line numbers of the lines to be copied and the number of the line after which they are to appear.

With the advent of the CRT some line oriented editors support a "local edit" command. With this command it is possible to ask the computer to list a line of text, placing the cursor upon it for updates. The user may then move the cursor over the line, making selective changes, inserting characters or deleting characters at will, and when the return key is pressed, the modified line replaces the old one in memory. An "edit" command can become the most useful in the line oriented editor's command set.

Other commands can set tabs (as on a typewriter), erase all text in memory to begin entering a new document, and display the amount of memory left in which to enter text. There are also many word processing functions which can be included as commands which will be covered in more detail in the next section.

FULL SCREEN EDITORS

Most full screen editors operate similarly, at least on the surface. A group of text lines is displayed upon the screen and the user may move his cursor around at will to make changes. The screen can be thought of as a window or "viewing port" on the text in memory. Using control commands, the user can move this window around over the text in memory, allowing him access to different parts of the document. In general there can be commands to move the cursor up, down, right, left, to the upper left corner of the screen, the bottom left corner, the end or beginning of a given line, or to preset tab positions. In each case the movement of the cursor does not affect the text in any way. In addition, there might be commands to move the screen window "down" or forward through the document, "up"or backward, and, if horizontal windowing is supported, to the right or left. This latter movement would only be necessary if lines in the document could be longer than the line length of the screen. Commands to move the window to the beginning and end of the document, or to the 31st line (for example) are also useful.

Other necessary commands include a searching capability similar to that in the line oriented editors. When the target string is found in the text, the cursor is left over it to make changes easier. A global search and replace is also a must. It should be possible to delete characters in a line and have the editor shift the remaining characters over to take up the space occupied by the deleted ones. Conversely, an "insert mode" should be provided to allow characters to be inserted in the middle of a line, shifting remaining characters over to make room. In the vertical direction, there is a need for a line delete command and a line insert command or mode as well.

Most full screen editors provide a means for moving or copying blocks of text lines from one place in the document to another. This is usually done by first "marking" the first and last lines to be moved with a special command, saving the block thus marked in an internal holding area, moving the cursor to the new place, and recalling the saved block of text. This mechanism is virtually universal for full screen editors which do not use line numbers.

Other commands can allow for the shifting and tabulating of text, splitting or joining lines, and setting, clearing, and using tabs. Ringing a bell (or beeping) when text is entered past a certain column is also a nice feature. Some editors allow commands to operate on words. A control key might delete the word under the cursor, for instance.

Since there are only so many control keys on the keyboard, it is possible that the editor must operate in different modes. Some editors have a "cursor movement mode" in which the control keys move the cursor or the window. Entering another control key might place the editor in "change" mode, redefining the control keys to have entirely different meanings. In general it is better to avoid this design due to the added complication in memorizing all these commands, but some use of modes should be expected.

Some editors set up for word processing will automatically prevent the splitting of words across line boundaries. This means that as you type, should the last word on a line not fit (as is usually the case) the editor will automatically move it to the beginning of the next line for you. Some editors operate only in this mode, others provide it as an option. Editors which only operate in this mode are at times hard to deal with when you are trying to place data in fixed positions on a line.

Another important consideration in all forms of editors is the handling of upper/lower case. Some keyboards (notably the APPLE II and others) do not allow case discrimination with a shift key. Various schemes can be used to get around this. One is to assume all letters entered are lower case and require that upper case letters be preceded by a special character. When the document is "run through" the print formatter program, these two character sequences are replaced with upper case characters. Another, more agreeable way is to use a special key on the keyboard (such as ESC) as a "shift" key and to represent upper case characters on the screen with inverse video (unless an upper/lower case character generator chip has been installed). In either case, it is nice to have a "caps lock" mode as well.

THE FILE MANAGER

Once a document has been entered into the computer's memory via the editor, a provision is needed to save it to disk or tape. The file manager within the word processing package is provided for this purpose. Commands are usually available to load a document into memory which had been previously stored on diskette or tape, or, conversely, save a document which has been entered into memory with the editor as a file on a diskette. A command to list the documents stored on a given diskette is needed, as well as commands to copy, delete, or rename these files. Some of the more sophisticated file managers will allow the user to save a portion of the memory image (lines 250 through 273, for instance) as a file on the diskette, or to load a file from diskette as an insertion into the middle of the document in the editor's memory. Using this feature it is easy to piece together a document from "canned" prewritten segments.

One important consideration when evaluating a file manager is its use of a standard file format. Some word processors use a non-standard format for files, either to provide more efficiency, special purpose capabilities, or to protect the software from being illegally copied. If such a word processor is being considered, the user must ask himself if he intends to use the package for anything other than word processing. If the file manager supports a standard file format (one which can be accessed by BASIC or other computer languages), then the editor can be used to type in programs as well as text documents. Also, although many such packages also offer a form letter or mailing list capability, it may be desirable or necessary to interface your own mailing list files, written by other software, to the word processor. Non-standard file formats can also limit your flexibility when it comes to copying files and making backups.

THE PRINT FORMATTER

Second only to the editor in importance is the formatter part of the package. The print formatter accepts as input your edited document (either from the memory image created by the editor or directly from disk or tape) and creates as output a typewritten result on the printer. This may seem very simple, and it can be. Usually, however, the job of the print formatter is quite complex. A good formatter must keep track of how many words will fit on an output line, never allowing a word at the end of the line to be broken in half. It can justify the resulting line so that both the right margin and left margins appear even (more on this later), and it can determine when a page is full, and automatically go to the top of the next page and print a title and/or page number.

In the simplest case, input to the formatter is just pure text lines which are dumped to the printer without change. To cause the formatter to "massage" the text into a more presentable form, the user must insert formatting commands into the text at strategic places. This concept is also used by computer typesetting software (which is remarkably similar to word processing software) and the commands are the "mark-up" language. Thus, the user enters his text and "marks it up" with special commands to tell the formatter when to explicitly go to a new line, where a paragraph is to begin, and when to underline or overprint. In order to better understand the capabilities of a formatter, certain terms need to be defined.

LINE FILLING

Usually, the line length of the editor will not be the same as the final output image (although this need not be true). The Apple II, for example, has a 40-column CRT display but when printing a letter, at least 70 or 80 columns are required. To allow for this, the formatter can be made to do 'filling' or, to put it another way, it can be put in 'fill' mode. This means that, if after moving an input line (of 40 characters or less) to the output line buffer, if there is room for more characters on the output device, the formatter fills the output line by "stealing" words from the next line(s). On the other hand, if the output line is shorter than the input lines, the formatter will only use as many words on an input line as will fit, and will use the remainder as the first part of the next output line. Another use for filling is in updating documents. Suppose you have entered a document with the editor but now realize you left out a word. After inserting the word into a line, if filling was not available, you would have to either live with a line that is little longer than any of the others or else retype the remainder of the paragraph. With a filling option it doesn't matter what the input looks like, the output lines will be filled and look normal. When filling, some word processors will "eat" or throw away excess blanks between words reducing down to one blank between words and two following sentences. This practice can be either an asset or a liability, depending upon the types of documents being entered.

JUSTIFICATION

Related to filling is the concept of justification. Lines can be left justified, right justified, centered, or fully justified ("even margins"). Using a typewriter, everyone should be familiar with left justified lines. This just means that the text starts on the left margin and words are separated on the line by one space. Left justified lines have what is called a "ragged" right margin, since it is unlikely that every line will end in the same column. Right justification,

rather less useful, is the opposite of left justification. All the lines appear to have been shifted over to the right so that the last character in each falls on the right margin column. A fully justified line is similar to the appearance of typeset material such as one would find in a book. To justify such a line the formatter adds spaces between the words on the line (as evenly distributed as possible) to force the last word to end on the right margin. You could do this on a typewriter but this would require typing the line once, computing the number of spaces to add, and then retyping the line, adding the proper number of spaces between each word. Examples of normal left justified text and fully justified text are shown in EXAMPLE A and EXAMPLE B respectively. EXAMPLE B may appear better than ordinary typewritten text but it is still a long way from the appearance of typeset material. This is largely due to the limitations of a typewriter. An ordinary typewriter (and most computer printers) will "escape" or move the carriage a fixed distance after each character is typed. Thus, the carriage moves the same distance for the letter "i" as for the letter "D". Newer printers, such as the Qume, Diablo, and Spinwriter, allow this "escapement" to be varied, depending upon the last character typed. This is called "proportional spacing". The result is a product much more akin to typesetting (EXAMPLE D). Since these printers can, under computer control move their "carriage" in very small increments, it is possible to justify lines much more evenly than before also. This practice is called "incremental justification". EXAMPLE C is the result of both proportional spacing and incremental justification. At the time of this review there is no word processing software which takes full advantage of these new printers. The closest any comes is in providing incremental justification — none supports proportional spacing.

Getting back to our discussion of word processing formatters, there should be a capability for filling and left or fully justified lines. Some word processors will operate only in the filling mode (it can not be turned off). This can be a disadvantage when tabular information is being entered (especially if the formatter "eats" blanks as mentioned earlier). In general, it is best if data can be entered either as a stream of words to be made into paragraphs, filling with or without justification, or as an exact image of the output (such as a table or chart), with filling and justification off.

Other formatter commands allow the user to specify left and right margins, the number of lines to skip at the top and bottom of a page, the title that is to appear at the top and/or the foot of each page, the position of any page number, line spacing (single, double, etc.), underlining, bold face or overprinting, centering lines, and paragraph indentation. Also useful in most formatters and mandatory in those which insist upon "eating" blanks is the ability to set up printer tabs so that columnar information can be printed.

Some of the more sophisticated word processing systems provide additional formatting capabilities. Among these is a "widow" prevention feature. A widow is a portion of a paragraph, usually only the first line or two, which may appear at the end of a page, with a remainder of the paragraph appearing on the top of the next page. This is considered undesirable. Some word processors will not start a new paragraph if only two lines are left on a page, but will automatically go to the next page. Trailing widows are also possible, but these are a lot harder to eliminate and usually only expensive typesetting software can deal with them.

Another advanced feature is the ability to process a form letter, reading insertions of name and address data into specific places in the letter. Some packages offer this as a separately purchased option, others provide it as standard. Also, some treat form letters specifically, while others allow a more general ability to read "records" from an external file, skip blocks, and loop.

Other features to look for in a formatter include support for special characters which may be available on a printer but not necessarily in the character set of the editing keyboard. Another useful capability is that of turning the formatter's output on or off. Many times, while "debugging" a document, it is desirable to print only a selected portion (in the middle or at the end) while still processing the beginning of the documentation for pagination, etc. This feature can also be used to insert comments to the person editing the document that are not to be printed on the final output. Lastly, some formatters allow commands to pause printing, prematurely abort printing, and obtain strings of text from the terminal for insertion into the documents (example: the document can prompt the person printing it for its output line length).

A final capability which can be much more useful than it might appear is the ability to "proof" a document by running it through the formatter and placing the output on the CRT exactly as it will appear on the printer. This can save paper and time.

A part of each formatter is its interface to the user. The interface should allow the specification of default margins, page sizes, whether forms are continuous or single sheets requiring a pause after each page in spacing, and, most importantly, the address of the printer interface. Some word processing systems will also automatically load the printer interface routine as well. It should also be possible to abort printing at any time.

EXAMPLES

The Association for Computing Machinery (ACM), which has long advocated freedom of expression for scientists around the world, now stands accused of censorship. The brouhaha erupted late last month when the 37,000 member society was accused of "censoring" two candidates' ballot statements for the association's upcoming election of national officers. The accusations were made by present office holders. They have accused the ACM "establishment" of trying to rig the election by this effort.

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(4)

A Cautionary Word

The programs available for microcomputers vary widely in performance and in cost. None of them will give the micro user all of the capabilities of a $15,000 standalone word processing system. If you have experience using one of these dedicated machines, you may be disappointed in the performance of even the best of the programs for personal computers. Remember, this machine is a general purpose, low cost machine that allows you to accomplish many different tasks. Word processing is only one of them. The dedicated word processors were designed specifically for this job and provide many extras, including function keys, that are not available on microcomputers.

But if you are not experienced with the dedicated machines you will find most of the programs presently available to be functional, many times more useful than an office typewriter, and considerably more fun.

Hardware Requirements

One of the caveats against purchasing a word processing software package for the Apple II is the additional hardware that might be required. If you are just entering the world of word processing, it is a good idea to try to find a software package that is usable with your existing hardware configuration. If this isn't possible, add in the cost of the various memory and interface cards (16K, 80-column, perhaps a Z-80 card) to the cost of your software. Some of the newer software offerings do not require any additional cards.

Remember that the basic Apple II has a 40 x 24 display which is not adequate for most word processing work. Also, the use of a TV set as the monitor screen for the Apple will limit the clarity of the characters because of its low resolution. The prolonged viewing of text on a TV screen can be very tiring to the eyes. The use of an 80-column card requires the use of a good high-quality monitor designed for the purpose. The higher the resolution, the better the quality of the text being displayed.

Selecting the proper printer for the output of text is also an important consideration. Ideally, we would recommend two separate printers. One, a high speed dot-matrix printer would be used for rough drafts, internal correspondence, and other hardcopy needs that do not demand the quality lettering produced by printers costing many times more. The second would be a "letter quality" printer (daisy wheel) used for the final, typewriter quality output of the word processing system.

Having two separate printers is an expense that most users will want to avoid if they can. The options are to evaluate your specific needs and to purchase a printer that offers the type of finished output which will satisfy you. If you are working with text that will ultimately find its way to a typesetter for printing, a dot-matrix printer will probably work well if you plan to "down load" your files directly to the typesetter. If, however, you are looking for a typewriter-like quality for letters or other documents, then you should look at the available letter quality printers on the market. Until recently, a printer of this type would cost between $3,000 and $4,000. Today, there are several daisy wheel printers on the market for under $1,000. One of the newest printers to hit the market recently combines a fast dot-matrix mode with a slower, higher density dot-matrix mode that is almost as good as a letter quality printer. It produces what is called "correspondence quality" printing.

If you plan to print a large number of letters or documents such as mass mailings, realize that the printing process will be both time-consuming and tedious. Feeding in paper, starting the printer, and otherwise babysitting the printing process demands time that could be utilized elsewhere. A printer that includes a buffer, or the addition of a printing spooler, will allow you to use this time more effectively by freeing up the computer for the next task. Software is what makes the Apple II into a useful word processing system. But the hardware selected to support the software is also of great importance. In your evaluation of the best word processing system for you, always consider the hardware required, and also what additional hardware is available to make easier the job of producing the final output.

CHOOSING A WORD PROCESSING SYSTEM

Depending upon the degree of intended use of the software, one should emphasize either functionality or ease of use. If you plan only occasional use or simple word processing such as correspondence, your primary concern should be ease of use. Price is not always a good indicator of the quality of a word processor. A powerful word processing system with lots of commands could be a burden if you must re-learn it each time you use it. Pay special attention to the degree to which the editor conforms to conventions to which you are familiar in your other uses of the computer. For instance, one word processor uses the return key to move the cursor up rather than the usual downward motion. The occasional user might find this much more of a liability than the same software's ability to add columns of numbers is an advantage. On the other hand, if you intend to do lots of word processing or if you will be entering books or manuals, a more powerful word processor might be a better choice. With extensive use, even the most unconventional editor can become familiar and easy to use; however, one which does not support a formatting function you need, requiring extra effort during editing, can be very limiting. In either case, you should see each piece of software you are considering demonstrated in a way approximating your use before purchasing.

FUTURE WORD PROCESSING SYSTEMS

This past year has seen a marked increase in the flexibility of word processing programs, especially for the Apple II. There is still a large gap between Apple II word processing software and dedicated, stand-alone word processing equipment. Looking to the future, we see additional entries into the word processing market that will further bridge the gap between low-end and high-end machines. It is unlikely, however, that a word processing program will ever be developed for the Apple II that will rival the large machines. This is due to several limiting factors: memory, keyboard layout and the number of keys, and the market itself.

Nevertheless, with a number of new machines making their way into the market, we should see several new offerings in the field of word processing software. Whether these products will be able to be supported for efficient running on the Apple II remains to be seen, but we will be monitoring the progress closely.

EDITOR

PROGRAMMABILITY — Some more advanced editors allow a limited programming capability. This could be used, for example, to run through the document, looking for a string, and then shifting text around in the lines where it is found.

USER DEFINABLE KEYS — The choice for the function behind a given control character ought to be left up to the user. Also, he should be able to define a key to be a string of characters; a commonly typed word (such as "the"), a string of editing commands, etc. [NOTE: As of this printing, this feature is part of the Apple III.]

HORIZONTAL WINDOWING — Most word processors do not need more editor line length than the width of a screen, but the use of the editor on other files with various record lengths would require the ability to move the full screen editor's window to the right as many times as is necessary to view the longest line.

TEXT COMPRESSION — Since storage on floppy disks is limited, a useful feature would be to compress duplicate characters (such as several blanks in a row) into a "compressed format" for storage on the disk. When the file is loaded later, these sequences can be expanded again.

SPLIT SCREENS — This feature allows the user to divide his full-screen editor display into two or more windows, each viewing a different portion of the file or different files. With a given command, he can switch between these windows, giving the effect of having several (smaller) terminals.

FORMATTER

MACROS — This could be the most important of all new features in a formatter. A macro is a collection of formatting information and text, all collected under a single special word. Whenever this word is entered into the text, it is replaced with the text and formatting commands it represents. Use of macros makes the setting up of standard chapter headings very easy, for example. Macros can be written to simplify a complicated formatting command set for a specific purpose, such as legal documents. Macros should be able to accept parameters at the time of their invocation as well (such as the title of the chapter).

TOP/BOTTOM PAGE EXITS — Used in conjunction with macros, this feature would invoke a given macro whenever the top or bottom of a page is reached to allow special formatting.

RECTO/VERSO — This allows a different head or foot title and page number placement for even or odd numbered pages. A capability for ejecting to an even or odd page should be provided so that chapters will begin on a right hand page.

KEEPS — If illustrations or diagrams are to be added after the document is typed, space must be left for them. This space is called, in typesetting terms, a "keep." Keeps can be as simple as skipping a few lines or as complex as allowing text to "flow" all around a rectangle in the middle of a page. The formatter should also allow for keeping a reference to an illustration on the same page (or its recto or verso page) as the keep for the illustration.

MULTIPLE COLUMNS — It should be possible to specify text to be put into several columns across the page like a newspaper. Doing this is complicated, since widows must be avoided on a column level and keeps must be handled properly.

PROPORTIONAL SPACING — To more closely approximate the look of typesetting on a Diablo printer or its equivalent, software should support true proportional spacing as shown in an earlier example.

INCREMENTAL JUSTIFICATION — Along with proportional spacing, justification should be at the 60th of an inch level with inter-word as well as inter-letter justification possible.

HYPHENATION — To improve the justification of short lines (especially columnar text), a good hyphenation algorhythm and exception dictionary for the automatic hyphenation of words is a must.

WIDOWS — Leading and trailing widows should be avoided both on a page and column basis.

SUB/SUPERSCRIPTS — For printers which can handle them, subscripts and superscripts should be supported.

MULTIPLE TYPE FACES — It should be possible to switch fonts or, in the case of a printer, pause to switch the daisy, ball, or thimble for headings and italics.

SPECIAL SYMBOLS — Support for math thimbles for producing formulae may be required.

SPELLING CHECKER — Algorhythms and dictionaries could be used to check spelling of common words.
TABLE OF CONTENTS/INDICES — A computer is well suited for compiling an index or table of contents from keywords embedded in the text.
BOXES, LINES, AND RULES — With the graphics capabilities of the Diablo type printers, drawing boxes or lines for tables and charts should be part of the formatter's command set.
PAGE VS. GALLEY — Most word processors produce pages. A "galley" is a continuous stream of text which is later cut up and pasted-up into pages for reproduction. Although one would expect the production of galleys to be a subset of page production, this is not always the case, since some formatters insist upon skipping lines or sending form feeds.
FOOTNOTES — In addition to superscript support, the footnote information should be made to fit at the bottom of the page on which it is referenced.
REVISION BARS — When revisions are made to program documentation, a vertical bar is sometimes placed in the margin to indicate to the reader where additions or changes have been made since a previous version.
COUNTERS — If several numbered paragraphs appear in a document, it is sometimes better to have the formatter assign these numbers sequentially so that insertions will not require extensive hand renumbering.
ABSOLUTE TABS — This is the ability to tab directly to a column on the line both forward or backward, within the margins or outside of them. This allows the overwriting of a row of periods with text by tabbing back to the beginning of a line to produce table of contents entries, e.g.:

CHAPTER 1 — I AM BORN 1
CHAPTER 2 — I GO TO SCHOOL 15

OUTPUT TO A TYPESETTER — It should be possible to produce an output file on the diskette from the formatter in a format acceptable as input to computerized typesetting equipment. Having this capability can save money when typesetting work is sent out to a typesetting service and reentered there. Since there are many kinds of typesetters and no industry standard for their input, this capability may not appear in micro-based word processing software for sometime to come.
VERTICAL JUSTIFICATION — Just as a line containing words can be justified by adding spaces between words and letters, so a page can be justified by adding small increments of space between paragraphs and lines.

CP/M WORD PROCESSORS FOR THE APPLE

By Andrew M. Seybold

Probably the most often asked question in a computer store, with its variety of hardware and software, is: "Which one is best?" Unfortunately, because of the many variables, that question cannot really be a single answer: one must consider the application, the amount of time that must be spent in learning to master equipment and programs, and the final price of the product, including any additional hardware needed to perform specific functions.

In an effort to partially address this question, I will use three of the programs reviewed in *The Book* as a starting place. Two of them, *WordStar* and *Peachtext* (formerly *Magic Wand*), are CP/M-based products requiring a Z-80 card, 16K RAM card, and an 80-column card. The third, *Screenwriter II*, requires none of these hardware additions (although it too supports a 16K RAM card, which speeds up the program).

I've chosen these three programs for two reasons. First, both *WordStar* and *Peachtext* have been established for a long time (relatively speaking, in the world of microcomputers); both were developed for use on CP/M machines and transported to the Apple; and both offer supporting packages for spelling correction, form letter creation, and other functions. Second, *Screenwriter II* is one of the better "written for Apple" products, providing many of the same functions found in the others.

Each of these programs is billed as a "professional" system by the distributors. To varying degrees, all fill that description. It is simply that, among "equals," there are some things that are more equal than others. First we need a definition of what constitutes a "professional" word processing system. I consider it to be a system that edits, stores, and prints text. It must be flexible in providing many options for the reconstruction of text from individual pieces or files. It should have the capability to merge files for printing applications, such as bulk mailings of letters. It must support a spelling checker of some sort (for those of us who didn't learn perfect spelling, or who have Apples that cannot spell), and it should support several other programs as well, becoming part of a "business" package of software. The most important consideration is that it must be straightforward to use. A person with a limited knowledge of computers should be able to run the program with ease. It should, in dreadfully tired terms, be "user friendly" and not require a formal education in "computerese" to use.

The editing functions of *WordStar* and *Peachtext* are superlative; and those of *Screenwriter II* are excellent, although not quite as easy to use or understand. *Peachtext* utilizes more commands that make sense to the user (e.g., LM is Left Margin, RM is Right Margin, PI is Paragraph Indent, IN is Indent, and so on). But *WordStar* allows the user to list a Help Menu on-screen at the same time the text is displayed. *Screenwriter II* uses a set of menus for ease of operation, and allows the user to switch between them at the touch of a key.

Since our last review, Peachtree has rewritten much of the original *Magic Wand* program, and added help commands as well as menus to assist the user through the program. Once, it was necessary to type the word "Edit" followed by a file name; this has been shortened to "ED," print to "PR," etc. One of the other improvements made by Peachtree that I find a great help is the new menu system. Previously, it was necessary to exit from the Editor mode, get the system A-prompt back, and then print. Now this is accomplished within the master menu. This allows the user to feel more comfortable with it, and makes *Peachtext* a far better product than it was.

WordStar is a "help" oriented program that displays menu after menu of commands which permit the first time user to sit down and start using the program with little or no assistance. As the user becomes more familiar with *WordStar*, the help menus can be reduced in size, leaving more room on the screen for text, and finally deleted from the screen. A simple command makes them reappear for another user. *WordStar* slows down when the full help menus are used. While this is somewhat distracting to the experienced user, it does allow the novice to prepare for the next operation. I found that the option to print and edit different files at the same time is not well suited for the Apple II. Each time the program requires disk access, either for the material being edited or the material being printed, the program bogs down. Should both the Editor and the Printer routines require disk access at the same time, there is a period of time when the user feels as if the machine has taken control of itself, leaving you at its mercy.

Screenwriter II incorporates many of the features found in *WordStar* and *Peachtext*, utilizing menus to gain access to both the editor and format/print routines. The work files are saved as standard files on a DOS 3.3-initialized disk, allowing spelling correction, the creation of form letters, and other functions to be performed on them. The manual provides two sections dealing with the editor. The first part covers the "Mini-Writer" section, a mode which permits the user to work the program with very little effort or learning time required. The second section, "The Creative Writer," delves into the use of the more involved and complex commands and functions, taking you from novice to expert in a short period of time. Though slower than either *WordStar* or *Peachtext*, not usable on a hard disk, and offering less powerful features, *Screenwriter II* nevertheless is still on a "best bets" list, especially for those Apple II owners who do not want to have to buy additional hardware. The 70-column screen is somewhat hard to read (because the characters are generated on the graphics page of the computer), but all in all the product is functional, and should be considered as first choice among Apple specific word processing packages requiring no additional hardware.

My choice for the best all around package on the market today is *Peachtext**. While *WordStar* is the best selling program, *Peachtext* is easier for the non-computer person to learn; it has commands that make better sense (and therefore can be more easily remembered); and it is faster. This is the program that I use. Since much of my writing includes margin changes, indents, tabs, and flush right text, I find *Peachtext* to be faster and easier to work with. My system includes an Omnivision 80-column card, which is software-driven; and, with the use of a Softkey programmable keypad from ABT, I am able to pre-program up to fifteen function keys in addition to those found on the Apple keyboard. I use these keys for cursor movement, insertion and deletion functions, and tabbing commands, all of which speeds up the process of "customizing" work to produce a more professional look.

One final thought: consumers interested in word processing should research the market, read *The Book* and other review sources, and try out a few different programs, if possible. Once you have selected the one that appears to best meet your needs, stop looking! The only way to become an expert with one of the available packages is to concentrate on it. Switching back and forth between software means switching back and forth between commands and formatting procedures, which requires learning time. Find the package that best suits *your* needs, and stay with it!

*Editor's Note: The personal preferences expressed in this or any other article in *The Book* do not necessarily represent the views of The Book Company, its staff or management. Matters of opinion are not presented as product endorsements.

SCREENWRITER II

Company: On-Line Systems
Language: Applesoft/Integer
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $129.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	**B–**	DOCUMENTATION	**C+**	RELIABILITY	**B**
EASE OF USE	**C+**	VALUE FOR MONEY	**B+**	ERROR HANDLING	**B**
VENDOR SUPPORT	**B+**	VISUAL APPEAL	**B**		

Screenwriter II is advertised as *the* program that allows the user all of the features and function of a professional word processing package without the need for additional boards for the Apple. No 80-column card, no Z-80 card, and no 16K language card are required.

The program itself works in both the 40 and 70-column formats. The format commands (40C and 70C) are hidden in the instruction manual; and references to them do not appear until page 51. The program defaults to the 40 column mode when you boot it up, so if you have the right hardware you must remember to switch to 70 columns each time you use the program. Having a 70-column rather than an 80-column format appears initially to be a *limitation.* If you consider the standard typewritten page, however, you will discover that it is normally only about 65 columns wide, with the rest of the space being used for margins.

The display of the 70 column text is not as good as an 80 column display, and on a TV set or color monitor it is hard to read. Using a good quality monochrome monitor for our tests made the screen appearance acceptable. The characters are generated on the program's graphics page, so they are not as crisp and clear as those generated by one of the 80-column cards used for other systems.

The manual is moderately well-written. The first chapter allows the user to get into the program right away. However, some of the information that is of great importance to a first time user is hidden in appendices which are not referenced in the Table of Contents. These items include STARTUP, DISKETTE USE AND CARE CHECKLIST, PRINTER TEST, and SHIFT KEY MODIFICATION. Each of these sections is well written, and should be consulted prior to using the program.

On-Line Systems' advertising suggests in part that *Screenwriter II* "moves word processing on a microcomputer into the world of the mainframe units." This is a bold claim indeed, and one to which I must take exception. *Screenwriter II* is an adequate program with many functions useful in word processing; but, due to the limitations of both the Apple hardware and the software itself, it does not even come close to the products being offered on a minicomputer, let alone a mainframe.

The lack of function keys is a major problem associated with writing a word processing program for the Apple II/II + . This lack means that multiple keystrokes are needed to accomplish many of the special operations that make word processing such a powerful tool. On-Line Systems has made some effort to utilize commands that make sense to the user and are, therefore, fairly easy to remember. CTRL-P is advance one page, CTRL-B is move the cursor to the beginning of the text, CTRL-E moves it to the end of the text, and so forth. But once the obvious commands are exhausted it takes some imagination to assign codes that are logical. Several of the commands used are different between the Command mode and the Insert and Change mode. This means that you not only have to remember a control code (or look it up on the chart), you must remember which command does what in two different modes of operation. For example, a CTRL-I in the Command mode allows you to insert text; yet this same command is a CTRL-C in the Insert and Change mode.

Screen cursor positioning is difficult at best. CTRL-A moves the cursor down the screen well enough, but there is no easy way to move the cursor directly up the screen. The ESC and CTRL-A keys move the cursor to the extreme left side before moving it up along the margin. (One of the better methods for screen cursor positioning is to use a joystick, putting the program in the "Mouse" operating mode.) Further, editing in the 70-column format is ridiculously slow: your buffered input gets so far ahead of the screen display that the user becomes confused.

The command chart furnished with the program is well laid out and easy to read. It is divided into Editor and Printer sections, and commands can be quickly located and used. The embedded command structure is excellent using a period (.) to precede the command, followed by two letter designations that represent command options: e.g., .LM is left margin, .RM is right margin, .LJ is left justify, and so on.

File management is accomplished in an obscure and strange manner, occasionally producing unfortunate results. When files become too long to reside in memory, the program saves portions in various places on the disk. Users are warned not to touch the disk drive, and for good reason: the program has been known to scramble a file or two, or even cough up program source code in the middle of text files. Empty disk space must be at least twice the size of your standard text file, in order to ensure a margin of safety.

All in all, *Screenwriter II* is a very powerful word processing package, offering most of the features required for occasional or medium use applications. As with many of the available packages, it takes some getting used to; and the manual is something less than outstanding. The Editor is designed to let the user become familiar with the basics of word processing and be able to produce usable output almost from the start. I was impressed with the program, and, despite its flaws, believe it to be a good value.

PIE WRITER

Company: Hayden Book Company
Language: Applesoft
Hardware Requirements: 48K, 80-column card and printer helpful

Department: Business
Sugg. Retail: $149.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C+	RELIABILITY	B
EASE OF USE	B–	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	C–	VISUAL APPEAL	C		

PIE Writer is a reworking of Programma's *Apple PIE*. The original *PIE*, a popular program, was an early entry into the world of word processing. Hayden has made every attempt to retain all of the features found in version 2.0 of *PIE;* and the 2.0 files can be utilized by the new *PIE* after they have been Muffined up to DOS 3.3.

Several new commands and functions have been added. *E* now stands for editing an existing file, *N* is to create a new one; and status information is now provided to indicate the name of the file being used, the length of that file, and the amount of memory remaining on the disk. The catalog command has been shortened to *C;* and although the key locations for edit commands remain the same, many of the names of the functions have been changed. Thus "POP" is now referred to as "Recall," and so on.

PIE Writer has two display modes. The first, without the use of an 80-column card, allows a display of 38 columns across the screen; the second, with a card installed, displays 78 columns of text. Both allow up to 21 lines of text on the screen at one time. The feature allowing the user to move to a second screen for additional line length has been retained as well. In the 38 column mode, this feature permits the display of up to 68 characters across the screen; in the 78 column you can get up to 128 characters. In this latter mode, the screen shifts to the right with an overlap of the two screens.

The Command Card furnished with the program is well-designed. A copy of the keyboard, showing the command symbols, is added to the standard key names. At first glance, a novice looking at the command sheet could be confused about using the program, as it is overly busy in appearance. But if you study the card, you will find that is is well-organized, and the functions are all grouped by use. As with the earlier version, illustrations are used with many of the commands to specify the number of characters, or some other option. There are almost too many commands: most of them will not be used by the average person. As an example, tab settings can be established with any of 7 different command combinations; and the use of both the CTRL and ESC keys are required for many of the commands.

The manual appears to be complete, with sample lesson plans offered in a clear and concise tutorial; and a reference section is provided that allows the user to find the specific command or series of commands needed to perform a function. Sections are also provided for "advance topics": form letter creation, data file access, label printing, and communications. For anyone familiar with machine language, the manual lists important starting addresses, giving you enough information to make modifications to the program.

PIE Writer is a very powerful word processor. It provides more functions than most users will ever need. The program lists so many different commands that it appears to be a more complex program to use than it really is. I'd recommend that you learn to use it with a minimum of commands, then as you go along add the commands that perform functions used for "fancy" productions. If you try to learn all of the available commands and functions at first sitting, you may come away with a negative impression of what is a fairly flexible package. It is reasonably priced, providing a lot of word processing power for the dollar.

FORMAT II

Company: Kensington Microwave Ltd.
Language: Applesoft
Hardware Requirements: 48K, 80-col. card, 16K language card optional.

Department: Business
Sugg. Retail: $375.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C+	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C+	VALUE FOR MONEY	C–	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	C		

Format II is the only word processing program to come complete with the necessary cable to perform a Shift Key Modification without requiring other tools. The instructions necessary to accomplishing this upgrade to the Apple are very complete. In addition, a chip is furnished for use with a Videx 80-column board. This ROM chip allows the Videx board to display characters in "inverse video," as required by the program. You are cautioned that, should you leave the game paddles plugged in and also plug in the shift key modification cable, "strange things" will happen to your system. The program also supports the five most popular 80-column cards with no other modifications.

The instruction manual is well-written, although the type size and design format leave much to be desired. (The manual is thick, so the decision to use microscopic type was probably based on economics.) No screen display illustrations or examples are provided, but the text walks you through the start-up procedures and operation of the program. One of the first sections is "*Format II* as a typewriter." It is quite detailed, allowing the first time user to get a feel for both the program and the computer as it relates to a standard typewriter. This helps smooth over intimidation problems that can often occur. But note: one of the more confusing references in the manual is to a "page." This term is used in place of a "file," and is another name for a complete document.

Margins are pre-set to allow a 72-column page. The manual describes how to change these default values; but its default settings (1 and 72) are not standard for word processing. This requires the user to change the values each time the program is used, which is rather a nuisance. One of the nicer features offered by the program is the use of the CTRL key as the Shift Lock key, corresponding to a normal typewriter. Not only does this give the user access to the special "super-shift" symbols on the Apple keyboard, it also allows the user to type in uppercase lines without having to hold down the Shift key or use two keys to enter Shift Lock.

The system also utilizes "word wrapping" in most cases. This moves a word down to start the next line if it overruns the right margin. (Some of the earlier Apple word processing programs merely divided the word between two lines.) *Format II* has in addition a unique system of automatically hyphenating words that, although too long for one line, would make the line too short if the whole word were moved down to the next line. If you type not a word but a series of letters, the program lets you know that it cannot insert a hyphen. Deciding how to handle the situation is left to you.

The program only allows you to input 60 lines of text at a time, a severe and often inconvenient limitation. After line 60 the computer "beeps" at you, and then you must choose between saving the page or printing it. You must exit the program's "edit" mode with a CTRL-D, return to the Main Menu, and decide what to do with your page. I found this irritating when working with longer documents. Forcing you to save the text at the machine's convenience rather than yours as you go along becomes an annoying intrusion. If the 60th line falls at a natural break, there is no real problem. If, however, it falls in the middle of a sentence or paragraph, it is disconcerting to have to stop, save the page, and then continue without the saved input being displayed any longer. And some saved text cannot be easily recalled.

Text formatting is required in order to be able to accomplish any of the more involved editing commands. Moving paragraphs, deleting sentences, or changing the parameters require you to leave the "edit" mode and enter the "format" mode of the operation. This is done by pressing the ESC key, calling up the formatting mode, then hitting ESC again to return to editing. Once you get the hang of this operation it is easy to do; but it demands a "mental" shift from the edit commands to the formatting commands, extra effort and thought on your part.

The program is menu driven. A full description of available options is displayed each time the menu comes up. Each operation is accessed through the menus; and switching from operation to operation is quite simple. If you hit Reset by mistake in any mode other than print, you will be returned to the menu with no disastrous results. Should you hit Reset during printing, it is possible to lose the information unless it has been saved to disk. You can move between edit, print, save, format, and other disk commands from the menu. If you need to initialize a new disk, this can be done from the menu without having to exit the program. Saving text in 60 line increments, the program will "remember" your document name and save the next page under that name as page 2. This is useful in that, once you have finished typing, the catalog of the working disk will indicate the file information by page. If you are working on a file called "Test" it will be displayed as Test page 1, Test page 2, and so on.

Error handling is well done. The most common mistakes and problems have all been addressed. For example, if you try to start a document that duplicates a page name which already exists, the program will remind you of that fact. If the disk is full, it will handle that problem also without risking the loss of text you have already entered.

The print routine allows you to "spool" the pages (text files) saved to disk. You can specify the starting page and the last page desired, combine different files from the same disk, and specify the number of copies of each you would like to print. Printing routines are menu driven as well. It is only necessary to answer the questions presented on the screen to properly configure the program for your specific printer.

Format II offers a full complement of editing commands: underline, find, insert, justify, close, search and replace, and most of the other functions that you would expect from a quality word processing program. It has some annoying drawbacks, but after getting used to the way the program handles pages (text files), and remembering to switch between the edit and format modes for full editing functions, it became fairly simple to produce good quality text using this program. For the user who produces short letters and documents this program is especially easy to learn and use. For longer documents, and multi-page letters, I found it to be cumbersome to use; and switching back and forth between pages proved to be a problem. Trying to compose on the computer, move paragraphs around between files, and format the entire job properly was a very time-consuming project. The program can be recommended only for light word processing chores, which makes it rather expensive compared to the other programs currently available.

EXECUTIVE SECRETARY

Department: *Business*
Company: Personal Business Systems, Inc.
Sugg. Retail: $250.00
Language: Applesoft
Availability: 4
Hardware Requirements: Apple II or II + with 48K and 80 column card or lower case adapter. Shift key mod to Apple is REQUIRED
Disk or Tape: Disk*

OVERALL RATING	C	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	D	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	B		

The EXECUTIVE SECRETARY is advertised to be a program with "office-of-the-future options." In addition to most of the standard word processing features, EXECUTIVE SECRETARY adds a connection to VISICALC and several data base management programs. There is also a mail-merge feature, electronic mail capability, and conditional printing commands.

The program has a great many useful features and, once gotten used to, could be a useful addition to your library if you require the unique features. This is a qualified approval since there are other, better programs should you only require a good word processor.

One of the first "features" of the EXECUTIVE SECRETARY that you run into is the need to modify your Apple — that's right, you are *required* to modify the computer. The good thing is that the modification will allow you to use the shift key for its normal function (with the EXECUTIVE SECRETARY). The bad thing is that you will probably void your warranty by making the modification. The necessary wire and connector is provided with the program package. The instructions for installation are not in the manual, but are an add-on; make certain that they are included in the package you purchase. For newer Apples, the alteration is quite simple; for older Apples, you will be required to take the case apart and perform a solder modification to the printed circuit board.

The program disk is protected, but the company has an excellent replacement and back-up policy. One back-up disk will be provided upon receipt of your registration form. Damaged disks will be replaced to registered owners for $7.50 (at least for the first year after purchase). A $7.50 fee for each will also get you program updates for a year or more.

The manual is organized into a series of lessons. These lessons teach the user the program features in a logical progression and should be followed explicitly, as the program has many commands to learn in order to use all of the capabilities. One difficulty encountered in testing the program indicated that the manual still has some kinks to work out. In general, the program reacted in the manner described in the manual; however, the screen display was not the same as that described in some cases. As one example, don't be surprised if the prompt character is not the same as defined (a black asterisk becomes an "up" arrow with the VIDEX board).

The program requires Applesoft to be resident in the Apple in order to boot; therefore, a system with a language card will require a double boot to load the language first.

The program is divided into modules from menus. The editor module operates as a combination character and line editor. In order to edit, you must first move to the correct line, after which you may then perform word and character operations within that line. There is no text movement from line to line as you edit, although there is a command to compress the text after editing. Each line is numbered in the edit file, but the numbers do not show on the screen. You can get them by printing a draft of the document, at which time they will be reproduced on the printer.

All of the standard features expected of a word processor are in operation with the EXECUTIVE SECRETARY, including wordwrap — and, the shift keys work. In fact, without the modification to the Apple you have to go through some complicated maneuvers to enter a capital letter on the screen! Typing response is rapid, with no loss of letters observed.

Changing text, once typed, is a bit of work since the lines do not scroll. On each line, you must either delete and then add text; for short changes, you can go into add mode behind the text to be deleted and then backspace over it, effectively deleting it. The replacement text may then be added and the document compressed. This latter mode must be used if you have to change the first character in any line, since the editing function only works on a line-by-line basis.

Moving text around in the document is relatively easy. Mark the text to be moved and then designate the spot to which it is to be moved. One caution — again with the first character in a line — the mark must be placed as the last character in the *line above*; otherwise, the first character will not be moved. This is not pointed out in the manual.

The editor will support approximately 3,500 words of text at any one time. There is no provision for scrolling to disk when memory is full; instead, the program prompts you to save all or part of the file before it will accept more input. For really long documents, you must split them up into subfiles.

Creating subfiles is just as easy as moving text; however, the same caution about including the first character in a line applies. The subfile concept is quite useful for applications where a great deal of typing must be done with few changes on a document-by-document basis. Subfiles may be referenced at any point in the text and will be included in the final document as if you had typed them in at that point. Other uses for a subfile would be to create printer formats, form formats, or abbreviation files (to be described later).

As indicated above, you have the option of printing a draft of your document as it appears in the edit file. This draft will have the line numbers on it and you may then use them to edit the document. Start at the bottom of the document and work up, so that if you have to delete a line you won't change other line numbers in the document on

which you might want to perform edit operations.

The search and replace feature of the program is quite different. You are only able to search for a rather short string (about 10 letters). Once found, a repeat search may be obtained by simply recalling the command; the string is still in memory. If you want to replace after the search, you may. Repeat replacements require several keystrokes to implement. There is no automatic global replacement.

A strange feature of the search function is that it does not appear to be sequential. When the search command is entered for a single letter in a file, the letter was found, but seemingly at random within the file. After replacement of the single letter, a space was also added. This function seems to require some work.

Another feature of the program behaves in a strange manner. When you type a string of letters and the input line length exceeds the right margin, the wordwrap feature causes single letters to appear at the screen edge as you type. When you use the file compress feature to try to combine them again, a space is inserted between each letter. There is no command which allows splitting a word from one line to another at print time.

The manual states that you may transfer files from one disk to another. This feature could not be made to work.

At print time, the program reads the file plus all the imbedded print commands and uses this text to produce the final document. The program uses Applesoft routines and does extensive character manipulation while printing. This results in periodic (and frequent) garbage collection. If the program appears to hang — just stay with it.

All of the standard word processing features are supported at print time. Page numbers appear where you specify or you may use a standard set of defaults built into the program.

You have the option of having the program remember where up to 10 variables are located so that in subsequent references you may specify the variable and have the page number printed in its place.

You may also reserve space for an included file. You specify the number of lines that are needed and the program will print that file only when its size does not exceed the physical page. This allows you to include tables or figures without worrying about their overlapping a page boundary. One example of this would be the inclusion of a VISICALC output into a document.

EXECUTIVE SECRETARY also allows filling in forms. You specify the horizontal and vertical spacing and then either input from the keyboard or from a file.

On text entry, you are allowed to define a set of abbreviations. These may be short words or long phrases. A three-character sequence entered into the text will used for any of these words or phrases. This is a particularly nice feature that should be of great value to people with applications that have complex phrases which are used often (like lawyers) or to people with items in repetitious text which occasionally changes. Build a library of these and simply include the library file at the start of the document.

Printer special character sequences are supported, but you must define those characters much like the definition of abbreviations. To use one of the commands, you must insert a three-character sequence within the document for each special character.

Currently, many word processors will do most or all of the functions described. The EXECUTIVE SECRETARY does not stop here, however. Included with this word processor is a data base management system in the form of an "electronic card file". Using this feature you define a card master with each line of the card having a given name. After this is done you enter data into the file. Once created, the file may be added to, deleted from, searched, sorted, and then printed or added to a text file for applications such as mass mailings. If the card file is printed by itself, reports may be created which generates total or subtotal lines containing numeric information. You may have up to 13 lines per card file.

Be certain to read the instructions carefully and experiment if you use the report generation function of the card file module. The tab stops specified differ depending on whether the data is alphanumeric or numeric, in which case totals can be taken.

If you want to combine these card files into a document, you should have two disk drives. If you do not, then the document file and the card file must be on the same disk.

You may also create "cards"using popular data base management systems. In this mode there is some difference between the ads and the manual. The manual states that only the DATA FACTORY program is supported. The ads and the quick reference card state that INFORMATION MASTER, ON-LINE, and CCA DMS are also supported. This reviewer did not have all of those available and could not test the claim.

For convenience, you are able to modify the data contained on cards prepared by systems other than the EXECUTIVE SECRETARY. A command exists which will change words on any or all lines from all caps to lower case (or reverse). The conversion is selective so that you may leave the first letter(s) of each word as a capital if you want.

One final bit of customizing which is quite useful involves conditional printing. You may test lines or portions of lines in card files and then make printing decisions based on those tests. This gives you the option of customizing your document depending on the contents of the card file. This feature is found in very few word processors.

Be certain to read the warning on page 71 of the manual regarding the types of printers the program will support. Most printers are supported, but the special features of some may not be implemented properly.

As an added bonus, there is an electronic mail option that requires a Hayes Micromodem in Slot #4 and a similarly equipped Apple on the receiving end. Also, if you have a California Computer Systems Clock in Slot #2 documents will be date and time stamped.

The EXECUTIVE SECRETARY has a large number of features that could prove very useful to an office. The program comes close to its claim of being a complete office package. It has a large number of options and several very nice capabilities. As problems and quirks are modified or corrected in the future, the program could become a valuable piece of software.

APPLE WRITER II

Company: Apple Computer Inc. [Special Delivery]
Language: Applesoft
Hardware Requirements: 48K, 80-col card and printer helpful

Department: Business
Sugg. Retail: $145.00
Availability: 9
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	B+
EASE OF USE	B	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	C–	VISUAL APPEAL	B		

Apple Writer II, released under the Special Delivery Software label, is a marked improvement on Apple Computer's initial entry into the text editor/word processing field. While not outstanding, this is a product of reasonable quality. *Apple Writer II* is easier to use than the earlier edition, it offers 80-column capabilities, and it introduces a powerful tool, the Word Processing Language (WPL), to its operation. It is a good starting package for the novice word processor.

In creating, editing, and printing text *Apple Writer II* offers most of the expected formatting and editing functions: inserting text (using the cursor move command), deletion (left arrow key), retrieving text (right arrow key), automatic on screen wrap-around, scrolling, superscript and subscript, and changing characters, words, lines, or whole paragraphs either manually or in the automatic global search/replace mode. When correcting text, errors first have to be deleted before new text can be inserted; you cannot "overwrite" the errors. This makes inserting characters a snap, but complicates simple corrections. You can adjust the printing format to meet different documentation needs: for example, producing form letters or repetitive texts such as advertising flyers. The program often resorts to multi-function CTRL key commands, the most common of which are listed in the Editor Menu. It also provides a necessary Help command key ("?"), which allows you to find out what to do next when you've forgotten without being forced to exit from the system.

Saving text to disk in binary files is fast and simple. You can save entire files, or selected portions of them. Files can be moved to different disks, wholly or in part, and you may also add text files in machine memory to the end of files. Tab stops are pre-set but may be redefined; the program now does underlining (although it still does not offer boldface commands); and it provides a way to create glossaries from your own documents.

The program works in a 40-column format, but for 80-column and simple upper and lower case capabilities you will need an 80-column display card. The Sup'R'Terminal board from M & R Enterprises is recommended; it is easy to install, and customer support from them has been good. Character display was sharp even on a 9" monochrome CRT. A shift key function simply by toggling the ESC key is available if you install a shift key modification (a hardware adjustment); this suggestion is made in the reference manual, with the proviso that to do so voids the Apple warranty. (Still, for ease of use, the shift key modification is recommended.)

The program's Word Processing Language is a tool that allows you to write your own programs using a special language. Its purpose is to make automated word processing possible. In place of entering text editor and printing commands from the keyboard, you can write a program to substitute for them. The WPL is a text file that consists of a series of Apple Writer commands. When the program is executed, the computer will perform those commands exactly as if you had entered them manually. It is an attractive feature. But, for the novice, the WPL is perhaps the most difficult thing to learn and most cumbersome to use in the whole program.

On the whole documentation is good, providing tutorials and a reference card for a quick check of the available commands. It does sorely lack an index. This lack led me to what is perhaps the package's weakest link: customer support. Unable to get a question answered, I phoned the "Customer Support Hot-line" only to find myself talking to an answering machine, which was both irritating and unhelpful. This problem plagues Apple Computer Special Delivery Software generally, and does not speak well of a multi-million dollar company.

Ease of use, wide availability, and especially its modest price have made *Apple Writer II* a popular program. It is adequate for most secretarial applications, but it has its limits. It does represent a good value, especially for the first time user interested in exploring the possibilities of word processing.

WRITE-ON!

Company: Datamost
Language: Applesoft
Hardware Requirements: 32K

Department: Business
Sugg. Retail: $149.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	C	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	C		

WRITE-ON! is a word processing package from Speicher Systems and distributed by Rainbow Computing. It consists of a separate editor and print formatter which are written in Applesoft and utilizes machine language subroutines. It requires a 32K Apple, at least one disk drive, and no modifications to DOS. Data is saved in a special text "file" format, but standard text files can be edited if desired.

The editor is line-oriented without the line numbers (screen/line oriented). This makes the image on the screen more "readable", but makes locating a line and moving and copying text more difficult. To accomplish the latter operations, the user has to pre-define (by issuing separate commands and moving the cursor) a "start of block", "end of block", and a "block destination". Once these have been defined, the user can then issue a command to move or copy the block. The editor in general uses a lot of prompts and requires a lot of individual user inputs when setting up and processing editor commands.

WRITE-ON! offers a reasonably complete selection of editor functions which include handy "repeat line" and "split line" commands. Dan Paymar's mode for upper/lower case is supported, as is inverse video for those computers not so equipped. A final comment regarding the editor concerns the omission of an "edit" command. With editors of this type, it is common practice to effect major changes to a line of text by first deleting the line then inserting the corrected data. Once a line is deleted by this editor, however, the cursor is positioned past the deleted line. An insert command at this time does not replace the deleted line but adds the new line one line too far into the file.

The print formatter supports a fairly complete set of embedded format commands. A nice feature allows multiple commands to be placed on the same line followed by text if the user desires. Another feature allows the user to customize a document by requesting input from the keyboard after the printing has already begun. "Headers" and page numbering (bottom center) is supported, but "trailers" and underlining is not.

The formatter is unable to print the file currently loaded into memory. The "just edited" file must be saved before the formatter is invoked, and must be reloaded if additional changes are required. A convenient mechanism is provided to print multiple files.

WRITE-ON! comes with adequate documentation which includes examples of both editor and formatter operation. It is a reasonably complete package, but it is also one of the most expensive. The performance of Applesoft, coupled with the disadvantages of line-oriented editor, tend to reduce the attractiveness of the package.

WORD HANDLER II

Company: Silicon Valley Systems, Inc.
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $199.00
Availability: 4
Disk or Tape: Tape

OVERALL RATING	C	DOCUMENTATION	C	RELIABILITY	C
EASE OF USE	B	VALUE FOR MONEY	C	ERROR HANDLING	C
VENDOR SUPPORT	B	VISUAL APPEAL	C		

Word Handler II is a simple, straightforward word processing program for the Apple II. Its introduction claims that you will be capable of doing "useful" work within 20 minutes of booting up the disk. The program *is* fairly easy to use, and easier yet to learn; but it is filled with odd instructions, and a continually "blinking" screen which is very hard on the eyes.

The program displays 66 columns of text with no additional hardware required. The characters are well-formed on the screen, although the "W" and several other characters are filled in, which makes them hard to read. In the 40-column mode, the program wraps lines in order to handle lines of text longer than the screen will display.

One of the first indications that this program requires a somewhat different type of control by the user is the fact that, in order to change the printer specifications, it is necessary to remember to hit the space bar while the program disk is booting up. Failure to do this will result in the default selection of the last printer specified. Other oddities may be found in the use of the Command characters in the "normal" (edit) and inserting modes. For example, the right arrow key normally moves the cursor to the right one space; when inserting text, this same key is used to indicate the end of the insert sequence. CTRL-L in "normal" use moves the cursor a line at a time (it should be preceded by an arrow key to indicate which direction); in the insert mode, this same command means to add a "half spaced carriage return." I noted other inconsistencies as well. The use of the ESC key leaves much to be desired. Hit the ESC key once and the next character you type will be in upper case. Hit it twice and you will have moved the cursor to the next tab stop. Some of the operations specified are executed by the use of the arrow keys. Copy, or delete a character, is accomplished by the use of the right arrow key, but cancelled by the left arrow key.

Yet, despite this, some of the commands make sense. CTRL-W, CTRL-L, and CTRL-P indicate the movement of the cursor by a word, line, and page, respectively. (However, remember to use the arrow keys to indicate the direction the cursor should move.) The command structure is limited; but includes most of the common commands.

Word Handler II offers several nice features not generally found in Apple word processing programs. One of the modes of operation is called a "form" document. In this mode, it is possible to set up a form that requires fields to be completed. When you call the file onto the screen, it asks that a document name be given for a finished product and creates a new file. The old file, or the standard form, is also kept intact so that it may be reused. If you have forms that need to be duplicated frequently, this is a very welcome feature. Another feature unique to this program is its ability to print "small" pages. This means that you can use an 8.5" by 11" standard sheet and print out four pages on it. The setup procedure is not easy to master: you must first determine exactly how many small pages are to be printed, and then lay out the paper to handle this. But the instructions are clear, and so with a little experimentation it is possible to end up with a document printed on both sides and folded like a small book. If you would like to have mirror image margins (the margin on the left page flush right, and the right page flush left), the program will allow you to set this up also.

Both the manual and the included instruction card are simple to follow and easy to read. The manual doesn't make use of any screen illustrations. But the text is well-written, and even a beginner should be able to produce a usable letter or document after only a few short sessions with this program.

EASYWRITER PROFESSIONAL

Company: Information Unlimited
Language: FORTH
Hardware Requirements: 48K, 80 Column
Department: Business
Sugg. Retail: $249.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	C	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	D	VALUE FOR MONEY	D	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

One of the better word processing systems available for the APPLE II, EASYWRITER, was written entirely in the FORTH language by John Draper. EASYWRITER incorporates a full screen editor, file management system, and formatter/printing interface, which runs independently of the APPLE disk operating system. Herein lies both advantages and disadvantages for the EASYWRITER user. Although the disk access for loading and saving text files is somewhat faster and more efficient in terms of space utilization, the inherent incompatibility with DOS prevents using EASYWRITER for anything other than word processing. Most essential features of a file manager are provided (LOAD, SAVE, DELETE, CATALOG), with the possible exception of RENAME, but there is no EXEC capability or cassette support, and copying files or loading/saving/appending portions of text files is cumbersome at best. Also, there is a somewhat arbitrary limitation of 31 files per diskette. Unless you are writing, a book this restriction could become a problem.

The editor is a well-thought-out full screen-oriented system employing control character for all its commands. Unlike some editors, there are not a lot of confusing modes (cursor movement, change, etc.) to keep track of, but it is sometimes difficult to tell when one is in insert/insert line mode or not. The editor uses the standard 40 column screen (in Version 2, anyway) with no horizontal windowing and automatically moves the last word at the end of a line to the next line to avoid splitting words. Upper/lower case is handled with inverse video (the Dan Paymar chip is not supported). Perhaps the two worst failings of the editor are the fact that there is no global replace command and the cumbersome move block command. Recovery from hitting RESET is possible but can result in some lost data and is a difficult procedure.

The print formatter comes with a full complement of formatting commands. It operates in filling mode only and all excess blanks are compressed to one blank. This makes setting up tabular information difficult, especially since the tab feature provided is a real nuisance, in that one must "use up" all the tabs defined even if only one is used on a given line. Another irritant is the fact that all formatting commands must appear not only on the start of a line in the editor, but also at the start of a formatted output line as well. The use of left margin and line length specifiers as opposed to left margin/right margin means that changing the left margin will change the right margin – also somewhat cumbersome. On the other hand, special characters can be defined, line spacing can be varied even to suppressing line feeds completely, titling and page numbers are available, and multiple files can be printed in a simple operation. A unique feature of EASYWRITER is its ability to make use of DIABLO, QUME, and SPINWRITER incremental justification (at least inter-letter spacing). No form letter or mailing label capability is available at present.

The printing interface is very easy to use and allows the specification of all the normal defaults (slot, page width, etc.). Special support for several common interface cards is provided, as well as the ability to load automatically a custom interface when the disk is booted. It should be noted, however, that some interface routines tend to drive EASYWRITER wild (especially if they change the right screen margin in zero page). On the whole, EASYWRITER is a good word processing system. It appears to have had the potential for being even better, but there are many places where the user is forced to do unnatural things for the sake of the programmer instead of the other way around. It should be considered especially when ease of use is of prime importance (its prompting screens and messages are very good) or if the DIABLO incremental justification feature is desired.

SUPERTEXT 40-56-70

Company: Muse Software
Language: Applesoft
Hardware Requirements: 48K, 80-column card and printer optional

Department: Business
Sugg. Retail: $199.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	D+	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	C		

Supertext 40,56,70 is an upgraded release of a program that's been on the market for several years. Muse Software has added several improvements to the package, but has still not learned how to produce an instruction manual that is concise and easy to use. The files are now protected on disks that must be initialized by the program instead of standard DOS files.

Confusion is something of a problem with this program. A quick reference card included with the program is helpful, but it lacks organization. As with the manual, you must hunt for the information required to perform a task. The Apple II keyboard and its lack of function keys makes it necessary for most of the special editing and format functions to be performed using combinations of the CRTL and/or ESC keys with other keys. For example, to lock the program into upper case characters you use CRTL-C; or to insert a block marker you use a CTRL-V. Some of these are logical (and are therefore easy to remember); but many of them seem to have been picked out of the air. Logical commands include a " + " to indicate forward text direction, a "-" for backwards direction, an "L" to move one line at a time, "P" to move one page at a time, and an "M" to insert an invisible marker that may be searched for (as when doing indexes or glossaries for documents). On the illogical side, you must remember that an "ESC-/" moves you to the end of a file, and "ESC-RETURN" places you back at the top of the screen.

Supertext is nevertheless one of the more versatile programs available for the Apple II. It includes most of the necessary word processing options, such as search and replace, page numbering, print headers, and user-definable characters. In addition, the program supports printers that will provide output with boldface, underlining, and the centering of text. The symbols used to denote these commands in the text are difficult to interpret and certainly hard to remember during proofreading.

One advantage to *Supertext* is that it can be used in three different column display modes: 40, 56, or 70 columns. This allows a first time user to purchase this package and, without having to add an 80-column card, sit down at the keyboard and immediately get involved in word processing. As users progress, an 80-column card can be added, making the 70-column mode operational. Although most documents are only 65 or 66 columns wide, the fact that they do not refer to the program as an "80" column word processor may prove confusing to some new customers.

The program does not require a shift key modification to be added to the Apple, although it is supported and will make entering text easier. (This modification, however, may void the warranty of the Apple, so be advised. But if you're already beyond the 90 warranty period, you have little to lose and much to gain from the shift key modification.)

"Learning time," the time required to become familiar enough with the program to be able to use it productively, is about 1 hour for a basic letter. It may take 3 hours or so to be able to handle a document of several pages.

Several special features are offered in the program. The first is the ability to design your own character sets. This allows you to define and build your own character set, permiting the use of unique or foreign alphabets, and/or characters not available on the standard Apple keyboard. The design process is complex, but the results may be stored to disk and reused later.

There is another special feature offered called "Auto-Link." This permits the linking of several different files on multiple disk drives. This feature supports the Find and Replace, and Print and Load commands, and is useful for handling "boiler plate"-type documents in which lines or paragraphs are put together to produce a finished document.

Overall, I found *Supertext 40,56,70* to be a reasonably good product, offering enough power and flexibility for most word processing applications. Learning the program, once you get past the poor manual, is fairly simple and straightforward. A novice should be able to produce a good quality document within a short period of time.

WRITE AWAY

Company: Software Solutions
Language: Applesoft
Hardware Requirements: 48K; 80-column card, lower case adapter, 16K language card optional

Department: Business
Sugg. Retail: ?
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	DOCUMENTATION	C	RELIABILITY	C
EASE OF USE	C	VALUE FOR MONEY	C	ERROR HANDLING	C
VENDOR SUPPORT	C	VISUAL APPEAL	C		

Write Away is not a program that is, as yet, well-known in Apple user circles. It is a full function word processor offering many features. The use of sensible commands allows the first time user to begin working with this program almost from the first session. "I" is Insert, "B" is Beginning, "Page" is page, and "Para" is paragraph.

The manual's instructions in the use of the program are clear and concise; and the glossary of terms is at the beginning of it, not hidden away in the back. What it lacks in screen pictures and illustrations is almost made up for in its descriptions of operations and how to perform them in plain English. One caution about the manual, however. The "$" is used to indicate the ESC key. This is pointed out in only one place, and can cause some confusion.

Some of the more interesting features supported by *Write Away* include the use of macro instructions which allow the user to define a string of commands that are all executed with a single keystroke. This is handy for pre-formatting a document's margins and tab stops. A "type-ahead" buffer is also supported, so the program will not lose any of its character inputs if you are typing while the program is performing some other task, such as printing.

"Word wrapping" is available, but can be overridden if desired; and the program tracks the number of keystrokes used as well as the total number of characters stored in the text buffer. Command codes are somewhat confusing, and consequently difficult to remember. But the program supports all of the normal word processing functions. An attempt has been made to humanize the program by the use of commands that "mean something" to the user. "D" is delete; "K" is kill a line; "G" is get characters of text; and "C" is change characters of text. Commands are provided that do some interesting, if confusing things: "-llcthere, I did it!!!$$" translates to: Went backwards 11 characters and changed those 11 characters to "there, I did it!!!" (Remember that the $ sign is really the ESC key.) Commands may also be chained to allow the execution of multiple commands. But this quickly becomes very confusing to the user. One example used in the manual is "mgWA$ = cWriteAway$v$$". This is used to search for and replace the string WA with the new string, WriteAway. Some of the combinations illustrated look more like mathematical formulas than commands. But with all of these command strings available, I was able to produce high quality text without having to resort to any of them.

Write Away supports "mailmerge" and form letter functions, in addition to several advanced features allowing text insertion if certain conditions are met. This can be handy for use, for example, in a letter soliciting charitable contributions. The amount of money donated, or some other variable, could be searched, and then replaced with another specific string of text.

The program is easy to learn, or at least the basics are. The more advanced features are useful, but require a considerable investment of time to learn them. All told, the program provides the same level of word processing power found in many of the other packages reviewed, but obtaining the same results demands a considerably more involved and potentially confusing process.

WORDSTAR [Version 3.00]

Company: MicroPro International
Language: CP/M
Hardware Requirements: 64K Apple II/II+; 80-column card; printer

Department: Business
Sugg. Retail: $495.00
Availability: 10
Disk or Tape: Disk

OVERALL RATING	A–	DOCUMENTATION	B+	RELIABILITY	A–
EASE OF USE	C+	VALUE FOR MONEY	B+	ERROR HANDLING	B+
VENDOR SUPPORT	A	VISUAL APPEAL	B		

WordStar remains the best selling of all word processing products presently available for the Apple. It is also available on many other microcomputers, and when "shop talk" turns to word processing, this program is generally held up as the best.

While I agree that it deserves most of the praise bestowed on it, I do have some reservations, primarily regarding its use by the occasional word processing operator. Because it is powerful, it is a very complex program, requiring a fairly long time to learn; and during that time, it requires an almost constant consultation of screen menus or reference cards until a high level of confidence and proficiency is obtained. If you do not use the program often, you will probably have to re-learn it each time you come back to it, which could prove frustrating.

A screen-oriented program, *WordStar* allows you to see on-screen almost exactly what you get on paper. There are only a few exceptions to this: for example, underlining and boldface type are indicated on the screen by Control characters. This is due to the limitations of both the hardware and the software package.

The program is slow to move between commands, especially if the full help menus are left on the screen (they can be turned off), and speed typists will find, as they return to typing text immediately after invoking a command, that they will "lose" — there is a delay in video display — several characters or even a complete sentence while the program is handling the requested task. ("Slow" is of course a relative term in the world of microprocessing: sitting in front of a blank screen for more than 3 seconds is slow compared to typing functions, and users tend to become impatient.)

A major problem with the program has to do with formatting: indentation, aligning text in columns, and, finally, right justification. All of these functions are used heavily in business, yet are awkward to accomplish with *WordStar*. They can be done, but not easily and not consistently. If, for example, you go through the effort required to change indents, line lengths, and paragraph indentation when creating a document, then forget to reset the margins when you reform the entire document, all of your nice work will have been rearranged to reflect the last margin setting selected.

Lining up text for use with a proportional printer is also difficult, unless you force a hard space after column numbers or items that you want to have lined up on a page. Otherwise, *WordStar* uses different increments for spaces, and the left edge of the text tends to look ragged.

Nevertheless, having voiced these reservations, I must admit that *WordStar* is an excellent program, well suited to both personal and business-oriented applications, and deservedly the industry standard by which all other word processors are measured.

WordStar is a CP/M-based and cursor-oriented word processor. Screen formatting for text is displayed as it will appear on the printer. *WordStar* can accommodate lines up to 240 characters in length. This is the most significant modification comprising Version 3.00. In prior versions, when the text line exceeded 78 characters in the display area, it simply wrapped around the screen. With this version, when you exceed the 79 character mark, the entire screen shifts to the left by 40 characters with no wrap-around. This means that you can no longer see all of the text on the screen at one time, but must scroll the screen in 40 character increments. If you have been using earlier versions, this change will take some getting used to. On the plus side, the change means that you no longer have to contend with tables that overlap on the same screen, resulting in much easier text alignment.

Added enhancements to *WordStar* may be used to advantage by specifying imbedded characters. These characters will be interpreted by either the print routine within *WordStar* or by the "MailMerge" overlay.

Because of the implementation of CP/M on the Apple, *WordStar* is hardware-dependent. Be certain to check the version you receive for compatibility with your particular configuration.

One particular feature of *WordStar* is noteworthy: you have to try hard to go astray in using the program. A very thorough help menu is available throughout all processing stages; after becoming familiar with the program, you have the option of reducing the help menus in size and scope. After you become completely familiar with the program, you can erase them altogether. This form of prompting is quite valuable.

All of the standard cursor controls are available (and then some). The control characters which move the cursor are logically organized on the keyboard. Moves by character and word can be performed in the horizontal direction and by line or page in the vertical direction. The cursor only moves within the text area. Word wrap is available on text entry and, as text scrolls down, the prior line is formatted as specified by the defined output format. Effectively, you can see in real time how the justification will look. Centering is also available.

Text entry is not limited to memory size. Scrolling will take place both forward and backward and, as memory becomes full, text is read from disk. Because of the characteristics of CP/M, you must make certain that you have sufficient room on the disk for the primary and temporary files. Otherwise, an error will result and you may lose text.

Another nice feature of the program is paragraph reforming. For each paragraph, you have the opportunity to change margins, line spacing, justification, or just "clean up" after editing. Optional hyphenation of words also occurs as paragraphs are reformed. *WordStar* has the ability to suggest places within long words for inserting a hyphen if moving the entire word would result in uneven line spacing. You may then accept the suggestion by moving the cursor to another location for the hyphen or force the entire word down to the next line. If this function is used and then the paragraph is reformed later, any word that has to be re-combined is done in such a way that you can later edit out the hyphen without disturbing the justification.

All common editing functions are included. Character, word, and line insertion and deletion are supported, as are all block functions. You also have the ability to read and write from additional files and set return-to-place markers. The search-and-replace function is quite flexible and can be performed one time, multiple times, or globally. Selective replacement (under operator control) is also supported.

Because text is formatted on the screen exactly as it will be printed, you will be able to determine page breaks as you are editing (unless you reformat with imbedded commands).

The print function operates on files that are saved with *WordStar*. Default values for margins may be used or dynamic reformatting may be accomplished, using imbedded print commands. Headers and footings are supported. Page numbering may start at any defined page. The page numbers may also be located in the center of the page or any other location for printing facing pages (left and right).The page number may also be imbedded within the header or footing on the document.

Page ejects may be automatic or forced (for instance, if the number of print lines do not fill the specified logical page size).

All of the standard enhancements supported by quality printers may be used by *WordStar*. Sub and super-scripts are supported, as are variable pitch and alternate ribbon color.

Justification may be accomplished by inserting spaces between words or by micro-justification in increments of 1/120 of an inch, if this feature is supported by your printer.

The print option also allows you to print one file while editing another in real time. The edit-while-printing function works quite well. *WordStar* seems to have overcome some inherent Apple hardware limitations. This allows efficient setup of files for later printing. There are provisions for reformatting text during printing, but there are no provisions for modifying text based on conditional statements.

WordStar comes with an INSTALL program for matching the program to your system; however, you still must match the exact version purchased to your basic system configuration.

The manual is extremely complete and well written. All commands are clearly described and examples are provided. Of course, with the help function, you should not have to refer to the manual very often after an initial reading.

All in all, *WordStar* is a superb program, filled with attractive features, and powerful enough to handle most text processing requirements for Apple users. It is versatile, and, once mastered, easy to use. Coupled with the "MailMerge" and "SpellStar" options, it becomes a major addition to any office using a microcomputer. Since *WordStar* is available on so many of today's machines, it has almost become a "universal" word processing program, so moving from machine to machine is no problem in most cases. Having mastered it on the Apple, a user could sit down at any number of different machines and produce a finished document without much re-training. A wise investment.

PEACHTEXT [Magic Wand]

Department: Business
Company: Peachtree
Sugg. Retail: $500.00
Language: CP/M
Availability: 3
Hardware Requirements: 48K, Z-80-column card, 16K card optional
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	B+
EASE OF USE	B+	VALUE FOR MONEY	B	ERROR HANDLING	B+
VENDOR SUPPORT	C	VISUAL APPEAL	B+		

In my opinion, *Magic Wand* was one of the best CP/M based word processing programs on the market. There was a problem, however, in that very few stores carried it, and fewer yet knew anything about it. Peachtree bought it, and has renamed it *Peachtext*. They have also added significant improvements to the program.

First, Peachtree added a master menu. The earlier *Magic Wand* required you to enter the editor and the print routines directly from the CP/M system level. Now you only need to type "MW" and a complete menu is brought up on the screen. From the menu, moving between the editor, print commands, spelling correction, mail merge, and data transmission sections of the program is as simple as typing a two letter name: "ED" for edit, "PR" for print, "MS" for spelling (Magic Spell), etc.

The commands are easy to learn because they all make sense: "LM" is left margin, "RM" is right margin, "IN" is indent, "PI" is paragraph indent, and so on. Even if you have not memorized the commands, you can still comfortably enter the editor and begin typing text. The print routines have default codes that will permit even the novice to produce acceptable text from the very beginning. The program may be learned in less time that it takes to master other programs. The commands are so well defined that it is easy to return to the program days later and continue from where you left off.

Help menus have been added which walk you through most of the commands. These menus are available at all times, but do not appear on the screen unless called up. They are excellent, as is the chart of commands included with the manual.

The manual is the best I've seen, divided into general information, self instruction, reference guide, and appendices. The "self instruction" section uses screen display illustrations as well as concise descriptions of each operation and command. A quick tour of this user's guide will allow even the first time user to become proficient with the program in a very short time.

Many of the features available in this program will only be used occasionally by the average user. Internal math, variables, a GET command for inputing new data from the keyboard, and string commands are all available. When you want to try one of the complex options, all that is necessary is to refer to the examples listed. This speaks highly of the manual.

The main word processing command menu supports entry into the editor, print routine, copy program; and such functions as delete file, rename document, display directory, get help, end the program, swap disks (it's not as easy to do this with CP/M as it is under DOS), and change the default drive. In addition, you can enter the spelling checker, mailing list, and even the data transmission program from the main menu. Peachtree has made the basic program a lot friendlier.

Files are handled as standard CP/M files; and they are copyable. One of the changes made that has caused some problems is that each of the files now ends with ".DOC." The original *Magic Wand* did not use the last three characters except in the case of backup files (".bak"). In order to help keep track of the various files, I developed a system of using the last three digits of the file name for the date or the type of file information. This file, for example, is called: "Peachtxt.evl" ("evl" stands for evaluation). Other files would have had ".let" for letter, ".quo" for quote, and so forth.

The program supports the most sophisticated printers, allowing boldfacing, super and sub-script characters, automatic page numbering, indexing, and imbedded commands. One of the features most utilized is the simple method of changing line length, indent parameters, and text formatting options. Once you get familiar with the program it is possible to use screen formatting to get a visual representation of the text's final appearance. Format changes may be made either by embedding commands in the text as you type, or by changing the default values prior to printing out the finished product.

The new mailing list program (sold separately) is very easy to use, and allows a full complement of "mailmerge" options. It will allow you to search the file, add a name, and sort by any field. The program allows you to design your own format, store up to 15 fields of information, and format labels. Used in conjunction with *Peachtext*, it provides the user with a very powerful system.

The spelling correction program is fast and easy to use. It comes with the *Random House Dictionary*, making it one of the most powerful programs available. You can build your own dictionary by adding words to the existing one, and combining the two. My copy would not integrate directly with the *Peachtext* menu because the spelling program was not named properly. It took several attempts to install it correctly on the *Peachtext* disk, but once up and running, it works well.

There is no perfect word processor, and there are a few things that I would like to see changed. First, the program is sold pre-configured for a specific machine and a specific printer. Should you change printers, or 80-column cards, you must get the program re-configured by a dealer, or send it back to Peachtree. Second, the default values provided for the print routine cannot be changed. They are not set up for any of the normal letter or document formats I am familiar with, and this requires adding commands to every document you produce. If the default values had been supplied for a standard business letter (or better, were user-selectable), it would have greatly increased the program's usefulness.

Peachtext offers more power in a word processing package than any other available for the Apple. It is easy to learn and simple to use. While one of the more expensive programs available, it should be seriously considered by users who need to be able to produce many high quality documents with a minimum of effort. The only foreseeable problem with this package is that you may have trouble locating a store which carries it. Even more trouble is trying to find someone who can provide you with a working demonstration of it.

MAGIC WINDOW

Company: Softape
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $99.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C	DOCUMENTATION	D	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	D	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	C		

As a word processing program, MAGIC WINDOW offers some interesting benefits as well as some drawbacks.
BENEFITS include:
(1) The user may display, by using horizontal scrolling, 80 cols. on the screen.
(2) With a Dan Paymar Board, the display will be upper and lower case.
(3) The program offers a typewriter simulation with physical and logical paging and a typewriter audio function for keys.
(4) Printer options are very flexible.
(5) There is a modern capability for data transfer of softcopy files.
(6) "Softcopy" print images can be stored on disk.
DRAWBACKS include:
(1) No underlining capability, only underscoring.
(2) Only one line allowed per title line.
(3) Text justification is on a line basis only; no global justification for printing.
(4) There is no indication given when tabs are set.
(5) No global search and replace function.

Overall, you might consider this package for some of its unique features, but as a general purpose word processing package, it is rather limited.

THE SENSIBLE SPELLER

Company: Sensible Software
Language: Assembly Language
Hardware Requirements: 48K, 2 drives recommended.

Department: Business
Sugg. Retail: $125.00
Availability: 7
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A–	ERROR HANDLING	B+
VENDOR SUPPORT	A	VISUAL APPEAL	A		

The Sensible Speller is an outstanding, comprehensive program for verifying spelling in a user's word processing files. Often one's writing ability is judged by correct punctuation and spelling, and so it is quite important to have a companion program such as this to add to one's favorite word processor. Four separate versions of the program have been developed capable of working with virtually any word processor that currently runs on the Apple II/II+. There are versions for CP/M, Pascal, Super Text, and all other word processors that save their files as standard binary or text files on DOS 3.3 disks. Each of these versions will run on either a one or two disk drive system.

Sensible Software uses a very fast machine language to handle larger files, comparing words in it to the 85,000-word *Random House Dictionary, Concise Edition* supplied on two disks. First, the file collects the most difficult, or commonly misspelled words. These are then compared to the 45,000 most used words contained on the main dictionary disk. Then the number of unknown words is listed. At this point, the user has the option of listing these words on the screen or printer, or reading in the second part of the dictionary. If the latter option is chosen, usually the number of unknown words will drop. This is a rapid procedure, as the program compares words against the dictionary at more than 1,000 words per second. As an example, a *Screenwriter II* text file was read into *The Sensible Speller*. It contained 1,213 words, 492 of which were rare. The 31 unknown words flagged after the first pass through the main dictionary disk dropped to only 21 when the supplementary dictionary was used. Naturally, these included a number of proper names not found in the dictionary in addition to the numerous misspellings.

My main complaint with all spelling checker programs is that they do not actually correct mistakes but only mark which words are misspelled or otherwise unrecognizable. I realize that this is in effect a safety feature which gives you the choice of whether to correct the word or not. But often I can't tell whether a word is misspelled, or simply not listed in the dictionary disk, and so I spend considerable time in looking the words up manually. But I must note that while running the aforementioned test I could not find the correct spelling of "infrared." Unable to find the word using *infa-* or *infe-*, I chose to use the program's search mode under "List Dictionary Option." I designated the wild card option, and asked the program to find all words similar to "inf?red." Much to my surprise, it listed the word "infrared" after scanning a portion of the first disk. This method of tracking words is certainly a boon to anyone who has trouble spelling; but it is rather inconvenient to users who have only a one disk drive system, because the text file and dictionary disk must be swapped frequently.

During the proofreading phase of the program, the user's file is reread and displayed in a three line window at the bottom of the screen. Reading is continuous until the program encounters one of your errors. Having seen the word in context, you have a choice of passing the word as okay, marking it with a predefined symbol in your file, noting the word for inclusion in your dictionary, or listing the dictionary for alternative words (as in the example above). Once you have completed proofreading, you can return to your word processor and search for those characters marked in your file for correction. I rarely like the program to mark my own files. I prefer instead to have the program pass each word during the proofreading phase while I mark the errors by hand on a separate listing. (This helps me to improve my spelling ability.) But there is one disadvantage to this system: if it is not marked, the program will ignore a misspelled word when it encounters it a second time.

The Sensible Speller offers a comprehensive dictionary. It is very easy to add or delete words from it; or you can create an entirely new specialized dictionary. After proofreading your document, you may choose to add several new words to the dictionary from your last file. However, this procedure requires two disk drives. There is also a global add feature for adding entire groups of words. You simply need to type all of the words into a word processing file. Words can also be deleted in a similar fashion. There is room for nearly 10,000 new words on the main dictionary disk, and this space can be checked on at any time.

There are a few limitations to this program. For instance, a document cannot contain more that 2,048 words in any file to be proofread (this depends somewhat on the length of the words involved). However, this should rarely cause problems, since a ten page document contains about 5,000 words on the average; so almost every other word would have to cause difficulty in order to reach this limit.

The Sensible Speller is an outstanding tool for anyone who does a great deal of writing on a word processing system. It eliminates much of the drudgery of finding and correcting misspelled words in a document, and can even perform a word frequency analysis of the words used in the text. It is simple to use, and the documentation is clearly written. The company also includes a paperback copy of the *Random House Dictionary, Concise Edition* in the package. I would recommend the program very highly.

THE EXECUTIVE SPELLER

Company: Sof/Sys, Inc.
Language: Applesoft
Hardware Requirements: 48K Apple II, II +

Department: Business
Sugg. Retail: $75.00
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**B**	DOCUMENTATION	**A –**	RELIABILITY	**A**
EASE OF USE	**B +**	VALUE FOR MONEY	**C +**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

The Executive Speller is a complementary program to the *Executive Secretary* and *The Personal Secretary*. It is designed to compare files produced by either of these systems and provides a dictionary to identify certain words. These words are then candidates for being misspelled.

The dictionary, which comes on the back of the program disk and must be copied from, is advertised to hold 25,000 words, but only comes with 10,000. This is only briefly mentioned in the documentation, so you may have to do quite a bit of dictionary maintenance before the program is matched to your writing style.

When proofreading, you may read only, or proofread and correct your copy. If you choose correction, you may update the dictionary as well. A single document or string of documents may be picked for operating on. You must be present for correction, since the program stops at each word and asks what you want to do with it. If you have a word misspelled the same way in many locations, you must correct it in every location; the program will not remember for you.

Updating the list is straightforward and may be done during document correction, or as a stand-alone function. Should you choose the latter and merge a full document disk with an existing dictionary, be certain that there are several programs on television you want to watch while the process takes place. Several hours may go by matching 25,000 words to another 25,000 words. This is no problem; just be prepared for it. A useful addition in the next version would be the creation of a file of words from the correction process which could then be added to the dictionary.

If you feel the need for checking your work as typed on the *Executive Secretary* or *The Personal Secretary*, this program could be useful. Just remember that it is not automatic and requires your attention during the run.

SPELLSTAR

Company: MicroPro International
Language: CP/M
Hardware Requirements: Apple II or II +
with 2 disk drives and installed WordStar program + Z-80 card

Department: Business
Sugg. Retail: $200.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	**B +**	DOCUMENTATION	**C +**	RELIABILITY	**B +**
EASE OF USE	**B +**	VALUE FOR MONEY	**C +**	ERROR HANDLING	**B +**
VENDOR SUPPORT	**B**	VISUAL APPEAL	**B**		

SPELLSTAR is super. End of review.

I wish that the editor would have let me simply submit the above as my review of this fine addition to WordStar. Indeed, it is super – but there are a few things that the buyer should know prior to purchase.

First, in order to use SPELLSTAR, you *must* have TWO disk drives (one for the disk with the text file on it and one for the dictionary). A third drive could be used to support the program disk, but is not required, as it is exchanged with the dictionary file disk when necessary.

In simplest terms, SPELLSTAR processes your text file, sorts the words to another file while eliminating duplicate words to be optionally included in the dictionary, merges the sorted list with the dictionary and checks for matches, and then flags all words that are not in the dictionary. These words, correct or not, are then examined for spelling errors or inclusion in the dictionary. Since some forms of the same word (plural, possessive, present tense, past tense, etc.) are included in the dictionary's 20,000 word vocabulary, the same word in its altered form may be displayed on the screen.

At this point, the sorted file is read, after optionally specifying that SPELLSTAR stop for each flagged word, at which point you can choose to ignore, fix, or set aside that word for later inclusion in the dictionary (or even make a supplemental dictionary of special terms). The corrections are done under the control of WordStar with all of its editing features; you can perform alternate processing between WordStar and SPELLSTAR as needed.

You have the option of updating the dictionary at any time by adding or deleting entries or you can create a completely new dictionary. Supplemental dictionaries can also be used for special terms for any particular application.

A word of caution – since SPELLSTAR takes your document apart, its work files are the same size as the document itself. In using the program, you would be wise to format a separate disk for the text file you are to work on and PIP (transfer) the file to that disk for the text file to that disk. This will avoid the problem of running out of disk space (except for very large files, which should then be split into smaller files).

(It took 1 minute and 40 seconds to flag 12 correct "errors" in this text.)

GOODSPELL

Company: Apple Special Delivery
Language: Applesoft & Assembly
Hardware Requirements: 48K ROM Applesoft, Disk Drive, Printer

Department: Business
Sugg. Retail: $60.00
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	D	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	D	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	B		

GOODSPELL is a handy program for Applewriter users who are prone to misspellings and typographical errors. Its dictionary of 13, 14 or 15 thousand words (as claimed in different pages of the documentation) is loaded prior to loading of the Applewriter file. In response to cuing by GOODSPELL, the printer slot and file name are entered. GOODSPELL sequences through the text and, on encountering a word not in its dictionary, displays the contextual line associated with the word, followed by:

"XXXXXXX" NOT FOUND. ENTER (Y/N)

Answering "N" causes the flagged word to be logged to the printer. A "Y" (or just a carriage return) acknowledges that the word is OK and not in the GOODSPELL dictionary. That word is also added to the incremental dictionary "peculiar to the file being checked", and will not be flagged again. While this works fine for a given file, it is annoying to see the same words flagged again in the next file.

The program works as advertised and is very easy to use. However, one can dispute the claim that "Its tireless eagle eyes perform more quickly and efficiently than a copy editor". In a test involving one page of text, its "tireless eagle eyes" spotted 45 words not in its dictionary, none of which were misspellings or typographical errors. The dictionary is obviously not built for this reviewer's type of correspondence. While Apple-oriented terminology and words were well-represented, other words such as "cassette," "player," "recorder," "television," and "headphones" were flagged, as well as all proper names, slang and jargon. Hitting carriage return each time for the 45 cases required as much time as a good copy editor would need for proof-reading that page.

The program's author uses a good portion of the documentation to rationalize the selection of the approximately 14,000 words that comprise the dictionary. The limited selection is necessary because of Apple's 49,152-byte RAM capacity. If these chosen words were to be those normally used by a specific Applewriter user, then Goodspell is certainly a logical and cost-effective buy. A significant improvement to the package would have been to permit each user to build his own portion of a permanently-saved vocabulary at the expense of a part of the incremental vocabulary.

DIC-TIO-NARY II

Company: Sierra On-Line
Language: Assembly Language
Hardware Requirements: 48K, 2 disk drives and printer helpful.

Department: Business
Sugg. Retail: $99.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	DOCUMENTATION	C	RELIABILITY	C+
EASE OF USE	C	VALUE FOR MONEY	C+	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	B		

Dic-tio-nary II is a spelling checker intended for use with word processing applications. Its 28,000 word dictionary can check for misspelled words, text, or binary files produced from a number of popular word processors. It is designed particularly to interface with *Screenwriter II*, *Pie Writer*, and *Apple Writer II* files; but, if embedded control characters are ignored, it should work with any word processor that saves standard DOS 3.3 files.

Dic-tio-nary II is a two-disk package. The program is protected, while the wordbook disk can be copied and modified. The user can add 1,500 new words in the standard configuration. Since the user can create many wordbook disks, each dictionary copy can be used for different applications. Adding and deleting words is entirely menu driven. The entire dictionary can be listed on a line printer. The listing is lengthy (130 pages), and cannot be printed in sections. You can only abort by hitting RESET, so if you need a listing, you might plan to go out for the evening while it is printing.

The program can be used with systems having either one or two disk drives. Single disk drive systems require extensive disk-swapping between the workbook and your text files. A disk swap is required every half page of single-spaced text on a standard sheet of paper. This is an annoyingly slow procedure when processing large files.

The only way you can accurately judge the processing speed is on systems with two disk drives. If the program is in the self-running mode, it prints unknown or misspelled words on the line printer. It takes five minutes to process five pages of single-spaced text. Because it supports 16K RAM cards, there is some speed increase realized during text processing.

When text files are processed in the prompting mode, you have a choice of ignoring the word, marking it as misspelled in your text file with your selection of a rarely used symbol, or adding it to the dictionary so that you don't encounter the word repeatedly in the file. These flagged words are shown in their proper context in a two-line window at the top of the screen. In addition, you can correct misspelled words within the file if you have a two drive system. This appears to be useful for minor changes; but this is not a word processor, and letters cannot be inserted or deleted. They use a temporary work file for safety.

Choosing the automatic mode allows you to print a list of misspelled or unknown words on the line printer. This mode offers only a list; it doesn't show where they are located in the document. The advantage of this mode is that the entire document can be processed unattended (if you have two disk drives). On single drive systems, the output is cluttered with disk swap prompts. It's too bad that the text file can't be marked simultaneously while the printout is generated.

A spelling checker is only as good as its dictionary. While 28,000 words is only a small portion of the approximately 600,000-word English language, this number can be adequate if you add your own personal 1,500 word dictionary. Although the program recognizes contractions, many plurals and adverbs are not recognized. The system dictionary didn't contain common words like "cat" or "awed" in its wordbook. In comparing *Dic-tio-nary II* with *The Sensible Speller*, the same document was tested for non-recognizable words. *Dic-tio-nary II* found 43 unrecognizable words in a lengthy six-pass procedure on a single drive system. Using the competitor's larger dictionary, 21 words were located. You get a significant increase in speed if you ask it to do a word analysis on the file and simply ask it to list unknown words.

I found the program useful for locating obvious spelling errors or words that contained transposed letters. However, the regular dictionary flags so many words it doesn't recognize that, even with the ability to scan sections of the wordbook, I spent considerable time using a book dictionary to make sure I'd spelled the words correctly. What I would really like to see is a spelling checker that gives me what it thinks is the correct spelling of a word and asks me if that is the word I meant.

Overall, I would recommend this program to anyone doing a substantial amount of word processing, provided you have two disk drives. Although it is not the best nor the fastest spelling checker, it has the advantage of being the least expensive.

APPLE II WORD PROCESSOR COMPARISON

I — GENERAL INFORMATION

NAME	COMPANY	PRICE	MIN. HARDWARE/SOFTWARE
APPLEWRITER II	APPLE COMPUTER INC.	$145.00	48K, DISK
EASYWRITER	INFORMATION UNLIMITED SYSTEMS	$249.95	48K, DISK
PIE WRITER	HAYDEN BOOK COMPANY	$149.95	48K, DISK, APPLESOFT, (80-col. opt.)
SUPERTEXT 40-56-70	MUSE SOFTWARE	$199.95	48K, DISK, APPLESOFT, (80-col. opt.)
WRITE-ON!	DATAMOST	$149.50	32K, DISK, APPLESOFT
WRITE-AWAY	SOFTWARE SOLUTIONS	$???.??	48K, DISK, APPLESOFT, (80-col. opt.)

II — RATINGS

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE AWAY	WRITE ON!
FUNCTIONALITY	B –	C	C	B	C	D
EASE OF USE	B	D	C	C	D	D
OVERALL RATING	B	C	C	B	D +	D

III — FILE MANAGEMENT

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE-AWAY	WRITE ON!
USES STANDARD DOS	YES	NO	YES	NO	YES	YES
FILE TYPE (T OR B)	B	?	B/T	?	T/B	T
MULTIPLE DISK DRIVE SUPPORT	YES	YES	YES	YES	YES	NO
CASSETTE SUPPORT	NO	NO	YES	NO	NO	NO
ISSUE DOS COMMANDS INSIDE OF PROGRAM	YES	NO	YES	NO	YES	SOME
PIECE FILE TOGETHER FROM SEGMENTS	YES	YES	YES	YES	YES	YES

IV — EDITOR FUNCTIONS

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE-AWAY	WRITE ON!
FULL SCREEN, LINE ORIENTED, OR SCREEN LINE ORIENTED	FS	FS	FS	FS	FS	SLO
EDIT COMMAND (LINE ORIENTED ONLY)	N/A	N/A	N/A	N/A	NO	NO
MODE ORIENTED (FS) (CURSOR MOVEMENT, ADD, CHANGE MODES)	YES	NO	YES	YES	YES	N/A
NUMBER OF COMMANDS	18	20	45	42	26	24
EDITOR SCREEN WIDTH	40	40	40/80	40/56/70	40/80	38
MAX. SIZE OF FILE IN MEMORY (K)	32	22	22	32	32	25
UPPER/LOWER CASE INVERSE (I), PAYMAR (P), CONTROL CHARS. (C)	I,P	I	U,L,P,I	ULPI	ULI	I,P
GLOBAL SEARCH COMMAND	YES	YES	YES	YES	YES	YES
CHANGE COMMAND LOCAL (L), GLOBAL (G)	L,G	L	L,G	L,G	L,G	L,G
MOVE (M), COPY (C) BLOCKS OF DATA	M,C	M,C	M,C	M,C	M,C	M,C
WORD SPLITTING AT END OF LINE	YES	NO	NO	NO	NO	NO
TABBING	NO	YES	YES	YES	YES	YES
LINE/COLUMN COUNTERS	NO	NO	NO	NO	NO	NO
BELL COLUMN	NO	NO	NO	NO	NO	NO
RECOVERS FROM ERRORS	YES	YES	YES	YES		YES
RESET RECOVERY PROCEDURE	YES	YES	YES	YES	YES	YES
CENTERING/JUSTIFICATION (PRE-FORMATTER)	NO	NO	NO	NO	NO	NO

V — FORMATTER FUNCTIONS

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE-AWAY	WRITE ON!
EMBEDDED COMMANDS	YES	YES	YES	YES	YES	YES
NUMBER OF COMMANDS	12	20	52	26	20	24
JUSTIFICATION FULL [F], LEFT [L], RIGHT [R], CENTER [C]	F,L,R,C	F,L,C	F,L,R,C	F,L,C	F,L,C	F,L,R,C
MARGINS—LEFT, RIGHT, TOP, BOTTOM	YES	YES	YES	YES	YES	YES
VARIABLE LINE SPACING	YES	YES	YES	YES	YES	YES
VARIABLE PAGE LENGTH	YES	YES	YES	YES	YES	YES
PAGE NUMBERING TOP [T], BOTTOM [B]	T	B	T,B	T,B	B	B
PAGE EFECT COMMAND	YES	YES	YES	YES	YES	YES
PAGE TITLES HEAD [H] OR FOOT [F]	H	H	H,F	H,F	H,F	H
SINGLE [S] AND CONTINUOUS FORMS [C]	S,C	S,C	S,C	S,C	S,C	S,C
BLANK EATING [B] AND/OR IMAGE [I]	I	B	I,B	I,B	I,B	B
PARAGRAPH INDENT POS. [P], NEG [N]	—	P,N	P,N	P,N	P,N	P
TABS	NO	YES	YES	YES	YES	YES
UNDERLINING	NO	NO	YES	YES	YES	NO
INTERACTIVE WITH KEYBOARD	NO	NO	YES	YES	YES	YES
READS EXTERNAL FILE AS INSERTIONS	NO	NO	YES	YES	NO	NO
PROOF ON CRT	NO	NO	YES	YES	NO	NO
CHARACTER TRANSLATION	NO	YES	YES	YES	YES	NO
FILE CHAINING INTERNAL [I], EXT.[E]	E	E	I	I,E	I,E	E

NOTES: Each of the programs listed above have all of the commands and atributes listed. However, their complexity varies greatly. No attempt has been made to rate the use of the functions and commands.

VI — PRINTER SUPPORT

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE-AWAY	WRITE ON!
SETS DEFAULTS	YES	YES	YES	YES	YES	YES
PAUSE [P], ABORT [A] LISTING	A	A	A	A	A	A
SPECIFIC INTERFACE CARD SUPPORT	NO	YES	YES	YES	NO	NO
SPECIFIC PRINTER SUPPORT	NO	YES	YES	YES	YES	YES

VII — DOCUMENTATION

	APPLE WRITER II	EASY WRITER	PIE WRITER	SUPER-TEXT 40-56-70	WRITE-AWAY	WRITE ON!
ADEQUATE DOCUMENTATION	YES	YES	YES	YES	YES	YES
WRITTEN FOR NOVICE	YES	YES	YES	YES	YES	YES
SUFFICIENT EXAMPLES	YES	NO	YES	YES	NO	YES
TUTORIAL	YES	YES	YES	YES	YES	NO
REFERENCE CARD/SHEETS	YES	YES	YES	YES	YES	YES

APPLE II WORD PROCESSOR COMPARISON

I — GENERAL INFORMATION

NAME	COMPANY	PRICE	MIN. HARDWARE/SOFTWARE
FORMAT II	KENSINGTON MICROWAVE	$375.00	48K, DISK, 80-COL CARD
WORDSTAR	MICROPRO INTERNATIONAL	495.00	48K, DISK, CP/M, 80-COL CARD
MAGIC WAND*	PEACHTREE SOFTWARE	500.00	48K, DISK, CP/M, 80-COL CARD
EASYWRITER PRO	INFORMATION UNLIMITED	249.95	48K, DISK, 80-COL CARD
SCREENWRITER II	ON-LINE SYSTEMS	129.95	48K, DISK, APPLESOFT**

II — RATINGS

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN WRITER II
FUNCTIONALITY	B–	A	A	B–	B
EASE OF USE	C–	A–	A	B–	B–
OVERALL RATING	C	A	A	C–	B–

III — FILE MANAGEMENT

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN WRITER II
USES STANDARD DOS	NO	CP/M	CP/M	NO	YES
FILE TYPE [T OR B]	CONVERSION	T	T	B	T,B
MULTIPLE DISK SUPPORT	YES	YES	YES	NO	YES
CASSETTE SUPPORT	NO	NO	NO	NO	NO
ISSUE DOS IN PGM	NO	YES	YES	YES	NO
PIECE FILE FROM SEGMENTS	YES	YES	YES	YES	YES

* MAGIC WAND IS NOW "PEACHTEXT" AND IS MARKETED BY PEACHTREE SOFTWARE.
** INTERGER BASIC VERSION IS AVAILABLE ON AN EXCHANGE BASIS.

IV — EDITOR FUNCTIONS

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN-WRITER II
FULL SCREEN, LINE ORIENTED, OR SCREEN LINE ORIENTED	FS	FS	FS	FS	FS
MODE ORIENTED [FS ONLY]	YES	YES	YES	YES	YES
NUMBER OF COMMANDS	58	47	52	33	31
EDITOR SCREEN WIDTH	80	80	80	80	70
MAX. FILE IN MEMORY	1 page*	N/A	N/A	10K	64K
U/L CASE, INVERSE PAYMAR, CTRL CHRS	U/L,C	U/L,C	U/L,C	U/L,C	U/L,C
GLOBAL SEARCH	YES	YES	YES	YES	YES
CHANGE COMMAND [L/G]	L	L,G	L,G	L,G	
MOVE COPY BLOCKS	YES	YES	YES	YES	YES
WORD SPLITTING	NO	NO	NO	NO	NO
TABBING	YES	YES	YES	YES	YES
LINE/COL COUNTERS	YES	YES	YES	NO	YES
BELL COLUMN	NO	NO	NO	NO	NO
ERROR RECOVERY	YES	YES	YES	YES	YES
RESET RECOVERY	YES	NO	NO	YES	YES
CENT/JUST [PRE-FMT]	YES	YES	YES	YES	YES

V — FORMATTER FUNCTIONS

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN-WRITER II
EMBEDDED CMDS	YES	YES	YES	YES	YES
NUMBER OF CMDS	28	50	52	13	58
JUST [F,L,R,C]	F,L.R,C	F,L,R,C	F,L,R,C	F,L,R,C	F,L,R,C
MARGINS	YES	YES	YES	YES	YES
VARIABLE LINE SPACE	YES	YES	YES	YES	YES
VARIABLE PAGE LENGTH	YES	YES	YES	YES	YES
PG NUM [T,B]	T,B	T,B	T,B	T,B	T,B
PAGE EJECT	YES	YES	YES	YES	YES
PAGE TITLES [H,F]	H,F	H,F	H,F	H,F	H,F
SING, CONT FORMS	S,C	S,C	S,C	S,C	S,C
BLANK EATING IMAGE	I	I	B,I	I	I
PARA INDENT [P,N]	P,N	P,N	P,N	P	P,N
TABS	YES	YES	YES	YES	YES
UNDERLINE	YES	YES	YES	YES	YES
KEYBD INTERACTIVE	YES	YES	YES	NO	YES
EXTERNAL FILE INSERTIONS	NO	YES	YES	YES	YES
PROOF ON CRT	YES	YES	YES	YES	YES
CHR TRANSLATION	YES	YES	YES	YES	YES
FILE CHAINING [I,E]	I,E	I,E	I,E	I,E	I,E

**FORMAT II* Utilizes a "page" type file system with up to 17 pages per disk. "Page" size can vary and can be considered as files.

**SCREENWRITER II* can handle files up to 64K in length by using a "scratch pad" storage system on the files disk and sending text to this area during editing.

VI — PRINTER SUPPORT

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN-WRITER II
SET DEFAULTS	YES	YES	YES	YES	YES
PAUSE/ABORT	YES	YES	YES	YES	YES
SPECIFIC CARD	NO	NO*	YES	NO	NONE
SPECIFIC PRINTER	NO	NO*	YES	NO	NO

VII — DOCUMENTATION

	FORMAT II	WORD-STAR	MAGIC WAND	EASYWRITER PRO	SCREEN-WRITER II
ADEQUATE	YES	YES	YES	YES	YES
NOVICE	YES	YES	YES	YES	YES
EXAMPLES	NO	YES	YES	YES	YES
TUTORIAL	NO	YES	YES	YES	YES
REFERENCE CARD/SHEET	YES	YES	YES	YES	YES

NOTES: MAGIC WAND has been renamed PEACHTEXT, and is a product of PEACHTREE SOFTWARE.

*WORD STAR includes an "Install" program that allows use with multiple 80 column cards and printers.

MAGIC WAND (PEACHTEXT) must be purchased for the specific 80 column card and printer. Dealers have a special installation program to set-up the program with.

COMMENTS ON CHART INFORMATION

The above charts compare the programs that were evaluated. Because most evaluations are subjective in nature, we have resorted to charting as many of the variables as possible. Ideally, after reviewing the data presented here and talking to other users, prospective word processor buyers should be able to determine which of the programs is best suited to their needs.

We have listed several hardware options that are not required by any of the software packages, yet represent good additions which can be supported by the various programs listed.

A printing spooler (usually 16K or more of buffer) frees up the computer more quickly for other tasks. It should be considered if word processing requirements are such that time is wasted waiting for the printer to finish producing one job while another needs to be edited.

The addition of a modem to the system will allow the transmission of word processing files from one machine to another. This can be useful to transfer the finished files in several cases. If you have several machines, one of which is a letter quality printer, you could transfer completed files from one machine to another for printing. Files can also be transmitted from the Apple II directly to a typesetter, or between offices to create your own "electronic mail" service.

An external keypad is handy if it can be programmed to handle some of the more common multi-keystroke functions required. The Apple II has a very limited keyboard, and most word processing programs require multiple keystrokes for special editing and printing functions. This requires you to use the CTRL and another key, or ESC and another key, or CTRL and ESC and a third key to perform editing and formatting functions. By using a programmable keypad, many of the most common functions can be reduced to a single keystroke operation.

All of the programs we tested support the shift key modification. This modification allows the Apple II shift key to operate in the same manner as that of a normal typewriter. If you do not make this modification, you must use a combination of the ESC and CTRL keys to move from upper to lower case characters. While the modification may void any warranty on the machine (most dealers are happy to install this hardware adjustment for you), it greatly speeds up the input process. We strongly recommend that you make this modification. If you do not feel comfortable opening the machine and adding a wire, ask your local computer store to do it. One of the programs reviewed here furnishes a cable pre-wired to plug into the game I/O port and clip onto the keyboard. One manufacturer of 80-column cards furnishes a similar cable, enabling their card to make use of this modification.

None of the programs tested were written for hard disk operation, although both *WordStar* and *Peachtext* worked well with a Gallium 10 hard disk. This exception is due to the fact that both programs are written in CP/M, which lends itself to hard disk operation with little or no modification. Several of the other programs were tried on the DOS 3.3 part of the hard disk. (We used a Gallium 10, 10 megabyte system partitioned for 40 DOS 3.3 volumes and 2 CP/M drives.) In the case of protected programs (see attached chart), the programs could not be loaded or used with a hard disk. In the case of non-"copy protected" programs, we still had a problem because there is no way to change the volume number. (A hard disk system is regarded as Drive 1, volumes 1 through 40.)

None of the vendors contacted have any plans to provide hard disk versions of their programs. We feel that this may be a bit shortsighted. As the prices of hard disk units continue to fall, this storage medium makes more and more sense. Even with copy protected programs it should be possible to utilize hard disk storage for the text files that you work with, thus giving you greater flexibility and speed in processing longer documents.

HARDWARE REQUIREMENTS FOR WORD PROCESSING
APPLE II

HARDWARE:	Wordstar Ver. 3.0 Micro Pro Int.	PeachText (Magic Wand) Peachtree Software	Pie Writer Hayden Book Co.	Format II Kensington Microwave	ScreenWriter II On-Line Systems	Word Handler II Silicon Valley Sys.	Super Text 40 56 70 Muse Software	Write Away Software Solutions	Write-On DataMost
APPLE II/+ 48K	R	R	R	R	R	R	R	R	R
DISC DRIVE	R	R	R	R	R	R	R	R	R
2nd DISC DRIVE	O	O	O	O	O	O	O	O	O
16K/LANGUAGE CARD	R	O	O	O	O	O	O	O	O1
PRINTER-DOT MATRIX	R4	R4	R4	R4	R4	R4	R4	R4	R4
PRINTER-LETTER QUALITY	O4	O4	O4	O4	O4	O4	O4	O4	O4
PRINTER SPOOLER	O	O	O	O	O	O	O	O	O
Z-80 CARD	R	R	N	N	N	N	N	N	N
80 COLUMN CARD	R	R	O2	R	N	N	O	O	O
MODEM	O	O	O	O	O	O	O	O	O
EXTERNAL KEYPAD	O	O	O	O	O	O	O	O	O
OTHER HARDWARE: See Notes:									
SHIFT KEY MODIFICATION REQUIRED	O	O	O	O	O	O	O	O	O

Symbol Key

F + Furnished
N = Not Necessary
O = Optional
R = Required
1 = Increases Speed
2 = Specify make of card
3 = Integer version avail.
4 = Depending on type of output desired.

DATA BASE MANAGEMENT SYSTEMS

WHAT IS A DATA BASE MANAGEMENT SYSTEM?

A Data Base Management System, in formal terminology, can be defined as a centralized collection of data stored for use in one or more applications, utilizing hardware and software facilities to produce information in a display or hard-copy report format. That's fine as far as it goes as a generalized definition. However, a DBMS infers different meanings to various users. A businessman with a general ledger, inventory or sales analysis requirement will look at the management of a data base system on a more grandiose and sophisticated scale than the average user of a personal or microcomputer system. Hierarchical file structures, esoteric data access methods, data redundancy, data security and multi-terminal usage all fall within the realm of data base management systems as utilized by large organizations. Compare this with a data file a microcomputer may process, a record keeping system involving a personal checking account, book collection catalog or even a small business products inventory system. The differences are monumental. The ideal DBMS falls somewhere in between; one that can handle personal and business applications using the microcomputer with some of the approaches adopted by the large computer system users.

A data base basically consists of elements called fields, records and files. A "field" is nothing more than a unit or piece of information, such as the author's name in a book collection. The next building-block item is the "record," which contains a number of related fields involving a person, place, thing or (even) idea. A book, in itself, could be the equivalent of a record as defined in the above example, containing fields for author, publisher, copyright date, number of pages and any other element that pertains to what constitutes, a book. To go one step further concerning the building blocks for a data base, the "file" is composed of records which, in turn, make up a meaningful whole, much as a library contains a collection of books. A micro data base management system, then, is made up of a file or or files which contain related records embodying associated fields. These elements are identified by other terms (sometimes dependent on the mood of the overwrought user) such as data items, elements, segments and domains in larger systems, but they still are basically known and referred to as fields, records and files (in spite of IBM).

A DBMS is only as good as its inherent features. Primarily included among those features are the following attributes:

EASE OF USE – for short learning curve, menu design, and user-oriented operating features.
DATA RELIABILITY – for integrity of data, back-up procedures, and checkpoints for system failures.
FLEXIBILITY – for input and output formats.
DATA SEQUENCING CAPABILITY – for sorting in ascending or descending order involving multiple fields.
ARITHMETIC CAPABILITY – to add, subtract, multiply, divide, and exponentiate.
EDITING CAPABILITY – applied to date formats, decimal specifications, monetary formats, and numeric/non-numeric testing.
SELECTION CAPACILITY – for specified field or string values, record numbers, and numeric range searchs for record retrieval.
DEFAULT OPTIONS – for processing values and automatic report formatting.
REPORTING CAPABILITY – to display and hard-copy options, totals by control break fields, final totals, and columnar and vertical heading reports, label formats.
EXPANDABILITY – for field size, record size and file size.
MODIFICATION CAPABILITY – for system and program accessing (non-protection) for customized applications.

Looking further into the future involving the ideal micro DBMS, an idealized system would incorporate the following:

MATCHING, MERGING OR UPDATING WITH TWO OR MORE FILES – by processing options within a DBMS package.
TABLE LOOK-UP CAPABILITY – utilizing sequential, binary or displacement methods, depending on the look-up values (arguments) and how they are sequenced.
SPANNED DISK FILES – allowing for virtually unlimited file capacity and sorting range. (Currently implemented in some systems, but not all.)
SOURCE MASTER FILE EXTRACTION FOR BUILDING OTHER FILES VIA USER SPECIFICATIONS – either in the source master record format or "rearranged, added-or-deleted field" format (also included in some systems on a limited basis – i.e., "Data Factory 4.0").
HIERARCHICAL OR RELATIONAL FILE STRUCTURES – currently implemented in many CP/M systems, but not on the Apple because of memory restrictions. The IBM Personal Computer, with its 16-bit architecture, will be a prime candidate for these file formats – so, come on, Apple, start hustling.

DATASTAR [Rev. 1.1]

Company: MicroPro International Corp.
Language: Z-80 Machine Code
Hardware Requirements: Apple II or II + with two disks, Z-80 card. Printer optional but useful

Department: Business
Sugg. Retail: $350.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	**A**	DOCUMENTATION	**B+**	RELIABILITY	**A**
EASE OF USE	**A**	VALUE FOR MONEY	**A–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**A**	VISUAL APPEAL	**N/A**		

DATASTAR, at first glance, may be mistaken for a complete database system as the Apple user is used to seeing them (ala "DB Master", "Information Master", etc.). That is not the case. DATASTAR is a data entry, data retrieval, and data update system. It does not have comprehensive sorting, filing, and printing capabilities. What it does, it does well, however; and combined with other MicroPro products ("WordStar" with "MailMerge" and "SuperSort"), you have all the capabilities of the most sophisticated data management system. The price you pay for this flexibility and capability is dollars (you must have all of the subsystems to have the full system flexibility) and complexity (you must learn how to use three subsystems).

Probably the most useful feature of this program is the fact that it creates data files that can be read by a large number of other applications programs. That makes it extremely useful as an input module for applications. With DATASTAR you can input data to create or update a file and then access the file with inventory, accounting, employee applications, or many other applications without reentry of the data for each application.

Like "WordStar", DATASTAR has comprehensive help messages and instructions on the screen during data entry. This makes it unnecessary to refer to the user's manual every time you need assistance. In fact, much of the testing performed for this review was accomplished after only a short run through the manual. All subsequent help needed was on the screen.

Data entry is via forms that you create. Maximum character count per line is 255 as is the maximum number of lines. The default is 79 character by 17 lines; anything larger than that has to be specified before or during the form generation process.

When you generate a form you are not limited to just data as input. Any text may be entered into the form; thus, instructions or prompting within the form is acceptable.

During form generation, you can specify fields for verification as well as masks for editing. For example, if you so desire, you can specify that a two-letter state field be checked against a file of state abbreviations. This makes it difficult to add bad data by mistake. You can also specify an edit mask for data entry. Zip code fields can be designated as numerical only, preventing entry of alphabetic data.

The edit mask has other useful features. It allows you to specify that a particular symbol be entered in a given location in a field if there are other symbols on both sides of that position, or if only one side has an entry. This allows you, for example, to set up a field for entry of the new zip code, but the hyphen only shows up if you enter data beyond the fifth number. As another example, you can specify the format of a phone number for the standard format such as (xxx) xxx-xxxx; however, you must enter the numbers in order. DATASTAR will take care of the rest. The fixed characters may or may not be saved in the file at your option.

Another useful feature of the form generation function is the ability to specify computed fields. You may enter several numeric fields on a form that require a total. The total may be computed by DATASTAR and automatically entered during the data entry process.

DATASTAR provides several ways to search for specific records within your data file. You may search by key, search mask, or by record in the order entered. Any record retrieved may be edited, updated, or deleted as desired. Deleted records remain in the file marked as such and, through use of "WordStar" and "SuperSort", may be retrieved. DATASTAR, however, cannot select a deleted record. Periodically, you should perform file maintenance to reorganize the file by key index to remove the deleted records.

Data entry is extremely fast, allowing input at normal typing speeds. The system is designed for and supports high volume data entry. With edit masks, typing errors will normally be caught. This reviewer types quite fast and had no trouble with entry using the system.

Another feature that supports accuracy is the ability to batch verify jobs. In this mode, your data is placed into a temporary file for later verification by another person or yourself. This dual entry system gives the user a set of checks and balances.

DATASTAR also supports file access during data entry so that you can set up a file of standard parameters for a customer, have the operator enter that customer's number and have DATASTAR place the standard data into the form. Only the particular information that is to be altered need be changed. This is a great saving in time and promotes fewer errors.

The DATASTAR system is really two programs: FORMGEN and DATASTAR. FORMGEN is initially run to create forms necessary for data entry after which DATASTAR can be run when data entry is necessary.

Only a couple of problems were found during the review process. The manual that came with the Apple's computer version did not mention the Apple unique initialization options for the program. The Apple version will support the 80-column boards and ESC key capitalization just like "WordStar" for the Apple. The manual does not make reference to this.

A second, somewhat more serious, problem arose when attempting to print some created files using "WordStar" with "MailMerge". When data are entered via DATASTAR and the last field in the record is blank, DATASTAR simply ends the record with a comma. When "MailMerge" is reading a file for printing and it gets to the end of the file, if it encounters this comma, it will go to the next record and assume the first field as that entry – it ignores the carriage return that delimits the record. One could argue about whether this is a problem with DATASTAR or "MailMerge"; but at least that shortcoming is pointed out in the "MailMerge" manual, but not in the DATASTAR manual. MicroPro is aware of the problem (I called them), but whether it will be fixed or not is questionable. The workaround to the problem is to add one last field in your data file that is one character long with automatic fill of some unused character (like %), save that as part of the data file, and then, when printing with "MailMerge", simply read it in and ignore it on printing. In this way, your file will always end with a character and "MailMerge" will handle this anomaly properly.

DATASTAR is an excellent addition to your stable of programs if you have a need for a super data entry and modification program. The program becomes even more useful with "WordStar" and/or "SuperSort". You should consider it as a software investment should you need the features of this flexible program.

CONQUEST

Company: United Software of America
Department: Business
Sugg. Retail: $325.00
Language: Applesoft
Availability: 8
Hardware Requirements: Apple II or II + with two disk drives. SuperKRAM firmware board. Printer is helpful. Will support Videx 80-column board and Corvus hard disk.
Disk or Tape: Disk

OVERALL RATING	B –	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	B –	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	N/A		

CONQUEST is touted to be a self-compiling relational database. Before going into how well the program accomplishes this, perhaps it is best to describe what a relational database is.

There are three generally accepted database structures: hierarchical, network, and relational. The hierarchical structure may be thought of as a tree with records having a one-to-one or one-to-many structure. No dependent record (subordinate) may exist without the record (root) that it depends upon also existing. With the network approach, records are linked together into chains. Fairly complex structures may be created, requiring the system to maintain not only the database, but also the complex structure. The relational database may be thought of as a series of tables. Each table (called a relation) has independent rows specified by some combination of columns which uniquely identifies the row within the relation. This allows strict mathematical definition of the relation in terms of its tuples (rows) and attributes (columns). This mathematical relationship allows the database structure to be maintained rather simply. Unfortunately, like most systems, the relational database structure has its own vocabulary which you will have to learn. For simplicity, think of it this way: relations = files; tuples = records; and attributes = fields.

The CONQUEST program is provided on disk and should be copied to supply a working copy, with the purchased disk held in reserve. The catch is that the program requires a piece of firmware called a SuperKRAM board (KRAM = Keyboard Random Access Method). A ROM chip is provided that will fit into the KRAM board. If you don't have the board, there are versions of CONQUEST that are provided with it.

The program consists of four integrated modules: the definition sub-system, the maintenance sub-system, the query language sub-system, and the query execution sub-system. In brief, these subsystems create the database structure, enter and maintain data, design your request for data from the database, and execute that query.

The strongest feature of the program is its ability to order data from the database in virtually any manner and form the user might desire. The weakest feature of the program is its inflexibility in changing the database once formed. The user has no option but to add, edit, or delete information within the database when in the maintenance mode. If the database structure changes with time and new information must be added, the structure must be created again and all data reentered.

When defining your database, each relation is given a name (limited to 20 characters), a length (maximum of 255 characters), and a data type (any character or numeric only are the options). You are allowed to create or edit mask for data entry purposes if you picked numeric data as the data type. The edit mask allows a choice of date, telephone number, social security number, 2-decimal, 3-decimal, and N-decimal. No mask may be created if you designated the alphanumeric data type. For each relation you may also specify one of several criteria to be used on data entry. These criteria allow comparison to a literal, another attribute in the relation, an attribute in another relation, an arithmetic equation, a set of literals, or as a display only (where the program enters data based on a previously entered attribute and all you do is make certain it is correct). These options allow great flexibility during data entry. You are also allowed to define a default entry for any attribute and specify if the attribute will require automatic totals at report time.

Once the attributes are defined and laid out correctly to your satisfaction, the database is created. **Once this is done it cannot be undone,** so make certain that all the information you want is in the database before running the create sequence!

As mentioned earlier, the database maintenance is limited to adding, changing, and deleting tuples. Nothing else is allowed at this point.

That brings us to the subsystem, which is unique to CONQUEST: the query subsystem. A query is nothing more than a structured request for information from the database. Processing may be performed on the data prior to output. Unfortunately, three more terms must be learned at this point: navigation = input, selection = processing, and projection = output.

The CONQUEST program handles queries in two forms: the source language form (as entered by the user), and the compiled form (as used by the computer). Compilation requires some time but, once done, does not have to be redone; the compiled version of the query may be called from a library at any time. This library is maintained on the system disk as a CONQUEST database so at any time you may perform maintenance on the library to change names for display by the program.

The query language consists of seven basic commands with many options. These commands as specified in the manual are repoduced here:

OPTION	Used to specify processing options to the query compiler.
TITLE	Used to provide an optional title for the output of the query.
ASSIGN	Used to direct or route the output of the query to one of the system devices.
DOMAIN	Used to specify which database(s) are to be input to the query.
SELECT	Used to specify which data is to be projected and special options to be exercised, if any.
WHERE	Used to specify the selection criteria to be used in determining whether specific data is to be projected or not.
END	Used to define the end of the query source file.

In addition to these commands, there are a couple of syntax rules which are similar to Pascal, in that statements must end with a semicolon, but may be multi-line.

The first three commands are rather obvious in their use; the fourth is also obvious, but deserves mention since this command allows a single query to access many different databases. This is what makes CONQUEST so unique; several databases may be resident on disk in the system and you have the option of accessing any of them for a single report.

The select command tells which data elements are to be 'selected' from the database(s) and the where command allows manipulation of the data using logical evaluations or mathematical operations.

The entire query is built using an editor supplied with the program. The editor allows you to insert lines, change lines, delete lines, put or get files of source code from disk, append disk files to memory, and quit the editing session. It's not particularly sophisticated, but does the job.

All in all, the CONQUEST package is a useful database management system. Its most unique selling point is its ability to create queries, while its biggest drawback is its inability to change the database format once it is built. If you have a multiple database requirements in which information must be pulled from each for reports, then this program should be considered.

VISIDEX

Company: VisiCorp
Language: Machine language
Hardware Requirements: 48K, Apple II/II + .Two disk drives, printer card, and clock card recommended.

Department: Business
Sugg. Retail: $250.00
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A–	VISUAL APPEAL	A		

VisiDex is an information storage system that has its roots in the old "Whatsit" program. Information is entered on screens (electronic index cards) and catalogued using keywords. Recall can be done by keyword or by sequential search through the data base for specific non-keyword strings. Printing is sent to the screen, a text file, or to hardcopy, one screen or portion of a screen at a time.

The manual is quite good (as are all of the VisiCorp manuals). It is organized in the form of tutorials which take you through the program in an organized fashion. A reference section is included to cover details, and a quick reference card is provided for the experienced.

All disk operations, including initialization of a data disk, must be performed through the program. *VisiDex* uses a non-standard DOS.

The screen display and menus are similar to those of all recent VisiCorp programs. The top two lines consist of a command and status area, while the bottom two lines provide useful information (keywords in the case of *VisiDex*). This leaves some 20 lines for information entry on any given screen. This is a useful screen format, in that it makes all data that you need to operate the program available to you instantly.

Entering text is done in free form, and editing features are included which allow insertion and deletion of text within any screen. You may create keywords or phrases while entering data, or any time afterwards. At least one keyword must be associated with a screen before it can be saved.

Cursor movement during editing is done via a Control diamond, but the standard I,J,K,M keyboard designations are not used. *VisiDex* uses the W,A,S,Z diamond.

Once a screen is deleted, you cannot recover it; however, it still takes up space on the disk. To recover the unused space, you must back up the disk. This is not particularly convenient; however, it does force you to back up your data at intervals — a useful practice.

When retrieving data, the program gives you the option of keyword search or string search. Using a keyword results in rapid recovery; string search requires reading and searching all screens on a disk. Wildcard characters are supported.

For ease of data entry, templates may be created. In this way, a standard form can be available for use repeatedly at the user's discretion. The only caveat is that each template must have a unique keyword associated with it.

VisiDex makes it possible to move screens from one disk to another in addition to splitting a file. Text may also be transferred from one screen to another.

VisiDex has one rather interesting feature relating to the calendar. You are able to key a screen to a date and then use the program to show the screen several days or weeks before the keydate, or repeat the screen each weekly or monthly period. When you run the program it searches for a calendar card for the date. If found, that is used for the keydate search; if not, you are asked for the date.

The program also has a perpetual calendar. Any month can be displayed and, if a day within that month is a keydate on any screen that has been saved, it is marked. Note that within any file (disk), years are not relevant except to place the weekdays in the proper place on the calendar.

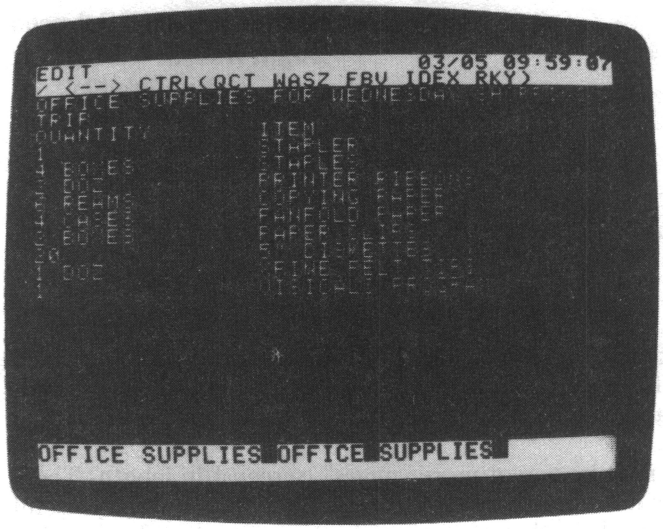
Many print options are included. The only thing you cannot do is extract data from the screens and manipulate it as you can in other data base management systems. Entire screens may be printed, or parts of a screen (starting from the top, down a specified number of lines). The only formatting you can do relates to data entry. If you force text into inverse video on entry, you have the option of printing it or not. For example, this would allow you to exclude telephone numbers from mailing labels.

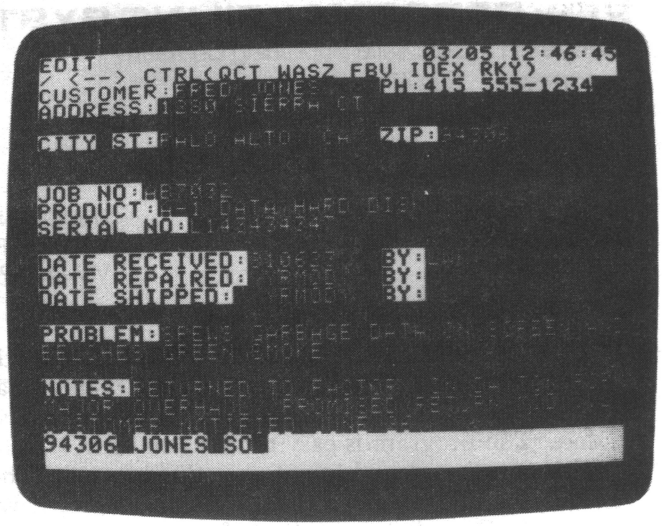
There are two conditions present when *VisiDex* will interact with standard DOS, for which two drives are necessary. On data entry, the program will read text files from the second drive. On printing, the program will print to a standard text file on the second drive.

Be careful when reading data from a text file. If you attempt to read beyond the end of the file, the program encounters an "end of data" error and may have to restart itself.

One minor annoyance is the keyboard sound. Each keypress results in a click; there is no command to disable this feature.

In many ways, this is a useful program, especially if you are involved in applications requiring keyword searches or calendar searches. If you can't think of an application, VisiCorp has listed 101 of them included in Appendix D of the manual.





DATAFAX

Company: Link Systems
Language: Pascal
Hardware Requirements: Apple II or II +], two disk drives, and 16K addition

Department: Business
Sugg. Retail: $199.00
Availability: 7
Disk: Disk

OVERALL RATING	**A**	DOCUMENTATION	**B**	RELIABILITY	**A**
EASE OF USE	**A+**	VALUE FOR MONEY	**A**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

Datafax is a data base management program that operates in a similar manner to *VisiDex*. Data entry is free-form on a screen or a series of screens. Recovery is through the use of keyword searches. This is a very flexible system for data entry and recovery, but is quite limited if you need to format different reports from your data.

While the program is written and runs under Pascal, you do not need the Pascal operating system. All of the files required to run *Datafax* are on the distribution disk. You do need to have a 64K configured Apple, however. Because the system runs under Pascal, your hardware configuration is important. The manual clearly spells out these requirements.

The data is organized in sets composed of folders, with folders made up of screens. Throughout, key words tie the data base together. Words, combinations of words (up to 28 characters), or dates may be specified as key words; and the program keeps track of everything in alphabetical order (dates come first). You may search for key words singly or in combination.

When entering data, *Datafax* uses a simple but effective screen editor. Commands allow you to move around the screen and insert/delete text or lines as required. Screens may also be moved, added, deleted, or copied. There is also a tab function.

All phases of operation are controlled by single or double keystroke commands. For the most part, any of these commands may be changed under user control to make a set more in line with a particular user's desires.

Data storage capability is limited by the mass storage available. Number and length of key words directly affects the number and length of folders which can be stored. The message is that key words should be short to be effective: this also speeds up execution. Keyword search also allows a wildcard character " * ".

Folders found by a search may be printed to a disk or printer. Printing keys are optional. If the keys are not printed, you may accelerate the number of lines that may be printed. From this, you may create a mailing list by putting the address in the top three or four lines of a screen with supplementary data following. To create the list, print only the top lines on all appropriate entries.

An autokey feature assists keyboard entry. With this, the same keys may be assigned automatically to one or to many screens or folders. An additional entry feature allows you to create standard Pascal text files with the Pascal editor and then read these files into *Datafax*. Only a few rather simple instructions must be followed to accomplish this. The *Datafax* files may be similarly downloaded into Pascal text files.

Datafax is extremely easy to use and, as a manager of a simple data base which does not require formatted reporting, it is quite useful. Recommended.

PFS: PERSONAL FILING SYSTEM

Company: Software Publishing Company
Language: Run Time Pascal
Hardware Requirements: 48K and 1 Disk

Department: Business
Sugg. Retail: $125.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A+	DOCUMENTATION	A+	RELIABILITY	A
EASE OF USE	A+	VALUE FOR MONEY	A+	ERROR HANDLING	A–
VENDOR SUPPORT	A	VISUAL APPEAL	A		

PFS is a sophisticated data management system with emphasis on ease of use. It allows information to be saved and loaded from diskette in a convenient fashion. Saved information can be easily displayed, altered, or printed. The manual, with its numerous screen illustrations, is clear and concise, and possibly the best-designed user manual to date. The program is easy to learn and use.

Information is stored in a user-defined format. The form may be one or more "pages" (screens) in length. There can only be one file per diskette. Furthermore, it will hold no more than 1000 forms. A unique and very useful feature of PFS is that even after a form has been defined and used, further after-thought items may be added to that form by entering data in an additional page called an ATTACHMENT.

PFS is completely menu-driven and self-prompting. The first menu, which you can retrieve at any time by simply pressing ESC, lets you: 1) CREATE a new file and form definition 2) ADD information in the next defined form, 3) COPY a file (requiring two disk drives), 4) READ individual specified forms for updating, printing or deleting, 5) PRINT, and 6) REMOVE a group of forms.

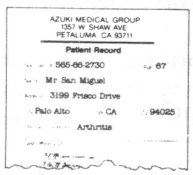
When creating a file, the user is prompted to design the form on the screen. You specify a name (which must end in ':') for each information item. The amount of space between names specifies the length of each item. For example, assume that a small employment agency wanted to keep a record of applicants and their skills on file to match them with job requests. A form might be designed with a typical entry like the following:

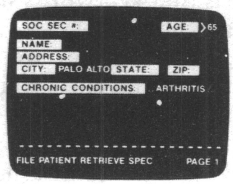
NAME: JOHN DOAKES
ADDRESS: 14013 PERRY ST.
L. A., CA 90260
JOBTITLE: PROGRAMMER
LANGUAGES: BASIC FORTRAN
EXPERIENCE: 5 YRS.
SALARY RANGE: 20-25M

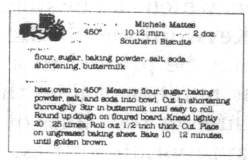
This form would have been designed directly on the screen with the CREATE option, while at the same time a diskette would have been initialized for containing the file definition for these forms. After entering applicants by using the ADD option, the READ option could be used to find candidates. The search function can specify a complete or partial match for one or more fields. For instance, the above screen would be displayed when performing a search for any programmer who knows FORTRAN. To add a form, the user is prompted with the form skeleton as defined when it was created. When forms are to be retrieved, the skeleton is again presented, and the user specifies the string values in the desired fields.

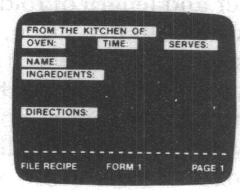
The PFS limitations lie mainly in the printing area. Since it is written in Pascal, PFS must be used with an Apple printer interface card. The forms will be printed as they are found on the disk - there is no sort facility. Additionally, there is no way to perform computations on numeric items.

PFS is a good example of a data management package incorporating free-form input features. Because of its inherent design, PFS is limited as a stand-alone system. Software Publishing Company has provided another package, PFS: REPORT (reviewed elsewhere), for overcoming the above-mentioned limitations by providing report formatting capabilities and a sort option. Used together, these two packages provide some "user-friendly" features (i.e., lengthy text input, powerful search options) not available in other file management systems. Ideally, the two systems should have been combined into one package; it is safe to assume that PFS: REPORT was created after-the-fact to meet the competition's capabilities in report structuring and sequencing. In many respects, they have succeeded admirably in responding to that competition.









PFS: REPORT

Company: Software Publishing Co.
Language: Run Time Pascal
Hardware Requirements: 48K and 1 Disk

Department: Business
Sugg. Retail: $99.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A+	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

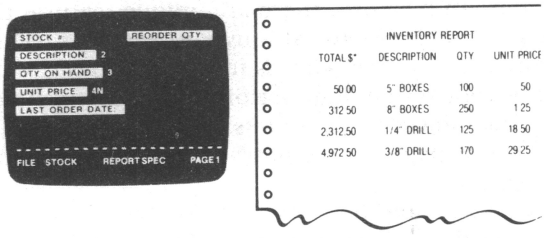
PFS: REPORT is designed to rectify some of the limitations in the original PFS (Personal Filing System) program. Essentially, PFS: REPORT is simply a report formatter designed to be used with the original data base manager program. Once you have mastered PFS, this program is easy to learn, since it uses the same command language. The user manual for REPORT is well done, as was the PFS edition.

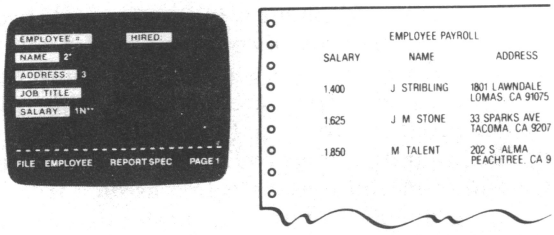
PFS: REPORT lets you define a tabular report format in the style of PFS. That is, you fill in display formats. For a given file, up to eight different report formats may be defined and saved. Any of the saved formats can be used to print all or some of the records in the file. In addition, the report records may be sorted with PFS: REPORT (if you own 2 disk drives), a feature that is not included in PFS.

To define a report format, you are prompted with the skeleton of the form. For each item you wish displayed, you must assign a column number from 1 to 9 which specifies in what order the form items will be printed. The report will always be sorted by the items in columns 1 and 2. If you do not want a sorted report, simply start assigning the items starting with column 3; however, you will then be limited to 7 report items. Each row in the report contains the information from one form in the file. You may also ask PFS: REPORT to print the count (number of rows) for a column and, for numeric columns, the average or sum of the column. When sorting, you can specify a sub-count, average or control totals for each change in the value of column 1. It is also possible to define a numeric column for receiving the arithmetic results of other columns. For example, if you had created a form with numeric columns for "number of items" and "price per item" and then defined a report which included these two columns, you could define a third column as "cost", the product of multiplying the two "item" columns together.

In order to produce a printed or displayed report, you must specify a new report format or use one previously defined. You are prompted for retrieval specifications in the same fashion as for READ in the PFS program; that is, you are presented with a skeleton of the form and requested to indicate which items to scan. A form may be selected by either a full or partial string match. In fact, you may request that forms be selected for an item that is not even shown in the report. After specifying the selection criteria, you enter a report title, the name of a saved report format, and the printing options for page size and device. If you want to create a new format or do not wish to use a previously-defined report format, you will be prompted to enter the column specifications for the report definition, which can then be saved for repetitive use.

PFS: REPORT greatly enhances PFS by supplying a badly needed "sorting and tabular" reporting ability. However, REPORT does not go far enough in allowing the user to determine the printing format. For example, the PFS manual indicates how to select and print mailing labels, but since PFS by itself can not sort, the labels could not be produced in zip code order (needed for bulk mailers). Using REPORT, you can sort by zip, but not print labels, since each form consists of and is limited to a single print line in the format table. Considering that the price for the two packages approach that of some of the less expensive data base managers (which allow more flexibility, but are harder to use), one would have to carefully consider if the ease of use for limited applications is really worth the combined price.





DATADEX

Company: Information Unlimited Software, Inc.
Language: Applesoft required
Hardware Requirements: Apple II or II + w 48K and DOS 3.3. Printer and clock card are useful

Department: Business
Sugg. Retail: $250.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

DATADEX is a data base management system that is a cross between a true index card version and other data base systems. It has quite a bit more flexibility than the current index card editions; however, it does not have the flexibility of most of the other more conventional file management systems.

Essentially, you are allowed to create a file using a screen format defined by you. The file will contain records comprised of the data entered on each screen (index card). Records are entered directly into RAM, unlike most other disk-based systems. When RAM is loaded, the data are saved to disk as a part of a file, called an extent. In general, the program is set up to work with the file extents individually rather than with the entire file. The major advantage of this approach is faster processing speed. Quite a few records (especially small ones) may reside in memory and, if disk access is not required, all processing is extremely fast. For those functions that would normally operate on the entire file, provisions are made to do so (sort, find, print).

The primary menu appears upon booting the system — with a clever logo and screen display. If the language card is used, you must do a double boot to first load the Applesoft language (assuming an Apple II). The first thing the program does is search through your peripheral slots and identify the cards. If all is correct, your peripheral configuration is stored on disk.

One thing noted while running DATADEX is that virtually all processing is done through control codes. Every aspect of the program has some control code command(s) associated with it. In some cases, these codes are the same or similar; however, in many cases, the codes do different things on different screens. Don't count on memorizing the commands unless you use them very often. A reference card is included to help.

You are advised to keep your records short in order to allow for many records per extent and therefore process more information directly in RAM. It is not necessary to fill each extent; in fact, some may be empty. You also have the capability of using the extents to subdivide the file into logical blocks for processing individually (for example, one extent for personal addresses and a second for business addresses.)

Creating fields and records is rather easy. If you are used to a word processor, be prepared to hit the wrong control key combination many times. The chances are that your word processor and DATADEX do not use the same commands for the same things. Recovery is easy — simply enter any command (like return) and the program resumes from where it was. Be careful in creating fields, since it is quite possible to overlap them. The program allows this. It is important to use care when defining fields, since you can easily duplicate the same field on top of itself. Listen for the beep as a field is recorded. If you hear more than one beep, delete the last field created and determine if one still remains.

Many field types are allowed and several pre-formatted fields are available. Among these are: numeric, floating-point, and text fields; pre-formatted fields consisting of date (two formats), clock (two formats) and phone (two formats) types; and three optionally-formatted fields consisting of full date, Social Security Number, and new zip code.

One very useful feature is the ability to translate records or fields from one file to another. In doing this, you may change almost any item involving record, field content and structure in the translation process; the program will delete entries no longer there, pad entries with blanks for those made larger, and truncate entries for those now shorter.

The program is loaded with clever techniques that keep your attention. In many programs, during disk read, you are left staring at a blank screen or some "stand-by" type message. With this program, the portion of memory accepting data is shown as a Hi-Res display; you actually watch the data going into memory. It's just lots of small dots, but this visual diversion does break up the monotony.

Editing within an extent is quite easy and, because all data are in memory, there are unique features that help. One of these is the browse command which allows you to step through records at a user-varied pace. The records flash by until you stop the scrolling. No more disk wear and tear just to see what is in the data base.

Several printed outputs are made available for reconfiguring your system and perform other useful functions. If you write programs that use DATADEX files (and you can do this, since the data disks are in a standard Apple format), the program allows you to add these routines to a second utility page. In this position, they are available to you as a menu item and may be called as such from the main program.

The program comes with one master disk and a demo disk with files and formats on it. You will be sent a backup copy of the program disk when IUS receives your registration card. A blown program disk will be replaced "at a minimal charge."

The manual is complete, but could be somewhat better organized. At times, you have to search for a command description, while some commands are not completely described. The manual might better be rewritten as a tutorial, followed by a reference section describing all commands.

VISIFILE

Company: Visicorp
Language: Applesoft
Hardware Requirements: Apple II or II + with disk. Two drives and a printer are useful. 48K RAM is required.

Department: Business
Sugg. Retail: $250
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	B+	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A–	VISUAL APPEAL	B		

The VISIFILE program was designed to be a replacement for the CCA DMS program, also sold by Personal Software. It is quite a bit more user-oriented than is CCA DMS and will probably find more users for that reason.

Like all of the recent VISI-type software, the package has an easily comprehensible, menu-driven structure and a well-written and straightforward manual. All functions are easy to understand and, once the manual is read, you will probably not have to consult it except for rarely used functions.

If the VISIFILE program will essentially replace the CCA DMS, the first question that arises is: can CCA files be converted to VISIFILE formats? This presents no problem other than, of course, any 13 sector CCA files having to be MUFFINed to 16 sectors. The data files are then simply renamed along with the MAINTFILES file. Only the data files can be converted; however, the report, label, and index files cannot be converted and must be reconstructed using VISIFILE. As a benefit of the conversion, you will find that the field ID used by CCA is no longer included; consequently, only the field name is used for record retrieval and/or updating.

The VISIFILE program itself constitutes a flexible file management system. Information is stored in fields within records contained in a file. Multiple files may reside on the same disk, but for large files this is not recommended. All records must fit on one storage disk (about 10,000 single page types allowable). Each record may contain up to 232 characters, consisting of up to 24 fields. Fields can be defined in alphanumeric or numeric format. Numeric fields may be up to 38 numbers in length.

A very interesting and useful feature of this program is the flexible formatting capability. With this option, you may change your data formats (within the maximum constraints, of course) at any time. An obvious example is the need to change your address files from a five digit to a nine digit zip code. With VISIFILE you may do this without reentry of data. The program will insert blanks in all those fields and as you acquire the new additions, you may simply append them to the existing zip code field in each record.

As a side benefit of the flexible formatting, you are allowed to create new files from parts of other files, append two existing files altogether, and create partial files.

File definition is straightforward and quite easy. On data entry, you may use the mapping automatically established by the program or you may remap the fields so that some are displayed on one page and others on the next page. The only disquieting feature of this implementation is in the display of fields which are larger than the screen size available to them. You are never allowed to see the entire entry at one time. As you enter data, the previously entered data scrolls off the screen to the left. On returning to accept the data, only the leftmost portion appears on the screen — you must remember where you left off, as you cannot see it.

Editing of data entries is easy; you are allowed to insert or delete letter by letter, or clear to the end of line from the cursor. This adds to the versatility of the program.

A rather serious problem encountered with the review copy of the program was the inability to configure the system for this reviewer's serial printer (a Diablo 1620 interfaced through the Apple Serial Card). Due to the approaching deadline for publication of this issue of The Book, there was not sufficient time to contact the software author for enlightenment. We do not know if this is an actual problem with the program itself or just a characteristic of the specific review copy received. Because the printer was not recognized by the program, no review of the printer report generation functions could be made. The formats appeared to work when sent to the screen, taking into account the 40-column width.

Both reports and labels may be produced using VISIFILE. The report width may be up to 225 characters in length. Labels may be produced in a variety of formats, including up to five across the printer page. Computed fields are available on output with user-specified formulae. Be certain to read the manual carefully since the formulae are read from left to right and PARENTHESES ARE NOT SUPPORTED. You must exercise care in producing the correct results.

As many indices of the data as you wish may be created. Only one is active at a time, however, so when you enter the data, don't forget to update the other associated indices after data entry. Using the indices, finding data is relatively rapid.

Of particular interest to the users of other VISI-type packages is the ability of VISIFILE to create Date Interchange Format (DIF) files from the data base. These files may then be read directly into the other programs for spreadsheet calculations ("Visicalc"), plotting ("Visiplot"), or statistical manipulation ("Visitrend"). Of course, the data files created by VISIFILE may be accessed by unique applications programs written by you.

The VISIFILE program is an excellent addition to the VISI-type applications stable. The flexible formatting features of the program make it truly useful, since its basic form may be adapted to many different uses. If you require a versatile file management program and can live within the short record constraints imposed by this one, then by all means consider VISIFILE.

DATA FACTORY [VER 4.0]

Company: Micro Lab
Language: Applesoft
Hardware Requirements: Apple II or + with 48K & at least one disk.
Supports printer, modem & 80 column card on output

Department: Business
Sugg. Retail: $150
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	B+	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B+	VISUAL APPEAL	B+		

The DATA FACTORY is a powerful file manipulation program that seems at this time to be in direct competition with "DB Master." The comparison is probably fair, although the programs are different in both form and, to some extent, function. The 4.0 version is quite different from the 3.0 version, so if you have, or are familiar with, last years' program, you probably will not recognize this one.

The package comes with two copies of each program disk and uses DOS 3.3. Two versions are available; the older version (somewhat updated), called the MINI FACTORY at $75, and DATA FACTORY. This review focuses on the advanced version.

You boot the disk to begin. If you have the language card or a 16K card, you must first boot a systems master disk to load the card with Applesoft and then boot the DATA FACTORY disk. All data and utility files are stored on the data disk and the program disks are write-protected.

The manual for DATA FACTORY is quite complete and comes in an easily updated binder with large easy-to-read index tabs. Reading the manual thoroughly before using the program is a must. There are many caveats on the running of the program (numbers of fields, length of fields, number of sorts, etc.). In most cases, the limits appear to be either reasonable or excessive for any use you might have. You should be aware of all of them, however, before starting, because weird things will happen if you don't heed the warnings. As just one example, if you guess wrong when asked what the longest field you will sort or search on is, you stand a chance of getting an out of memory error. All this is fully explained in the manual.

When entering data into fields, you have the option of moving forward or backward through the fields by use of control key responses. The ESC key will duplicate the field from the previously entered record. With numbers, the program accepts negative numbers and scientific notation. Records may be stored in memory for fast entry and then dumped to disk, or each record may be dumped to disk for the user who doesn't want to re-enter data on any problem.

Reports are available for many configurations; however, the output is not quite as flexible as some other systems available. You have the option of horizontal or vertical formatting and, with horizontal formatting, two fields can be placed in the first print line with other fields printed underneath. Up to ten formats may be stored for any file.

Printer set up with DATA FACTORY is quite good. Outputs of up to 600 horizontal characters will be supported by the program. You are also given the option of setting a left margin. For reports that must be placed into a binder, this is extremely useful. Any printer control characters that you require may be put into the program. If you require the ESC character for your printer setup, there is a procedure in the instructions for doing this. If you have an 80-column card, set this up as the printer slot assignment and you will be able to see any outputs as they would appear on a regular printer (with 80 columns) before committing the format to disk. Be certain to test the program with the card you have in the store before purchase, since this procedure may have problems with some boards, as a common set of control characters is not used to control the operation of the boards.

An interesting feature of the program is its ability to be used with a modem. Leave home in the morning with DATA FACTORY up and running with the menu on the screen. Call in from another Apple during the day and you will be able to access the program for any features that do not require disk change or printer output. (Note: This feature is reported here, but has NOT been tried to see if it actually works.)

There are handy features available with DATA FACTORY. The replace feature, for example, can replace up to 10,000 items in a single pass. Items may be replaced in all records, specific records, or only in records with specific entries in them. In addition, you may replace, add to, subtract from, multiply by, divide by, or make corrections to arithmetic fields. The 10,000 items are made up of 40 groups of 50 entries for changing five fields in each group. The routine works as rapidly as the Apple DOS can access the disk.

One useful feature of this program that is not available in most except as an add-on is the ability to transfer records from one data base to another or simply move the records to another existing data base. In addition, you are able to add or subtract fields to your data base, change field lengths or positions, append records (with the same or different file structure, although with different structures you may have problems), and make other useful changes. A method of testing a disk for a suspected bad sector is also included, as well as a way of moving the data surrounding that sector is also provided.

The sort routine is not particularly fast, but you may sort the file into any different format and save the sorted data base under another name. A unique feature of the program is its ability to sort dates when presented in the standard form: MM/DD/YY. Most programs require a YY/MM/DD format. You may sort up to 20 levels if necessary.

The math functions of the program allow you to add, subtract, multiply or divide one field with another. In any field, you may also total, average, or count items. When doing this, you may also invoke the from/to feature to search between two items (like two dates).

You may compare two fields and index fields. The index allows you to get a list of all of the record numbers in which a particular item appears.

One feature that could be changed relates to deleted records. With DATA FACTORY, you cannot recover these records before they are absolutely deleted by a sort. Since the records are only marked for deletion, it should be relatively easy to recover them.

Another handy feature of the program is its ability to output bytes available on your data disk.

Several other items are available for the user that are useful. There is a section in the manual that describes several applications in detail. File structure information is also available for the experienced programmer. Another section in the manual covers just about any error message that you might encounter and what to do about it.

Micro Lab has started a rather interesting expanded warranty plan for their programs. For a flat rate of $30 per year, Micro Lab will replace blown or damaged program disks in any number so long as they do not appear to be tampered with. In addition, for your money, Micro Lab will send you updates to the program as they are produced. Data disks are supposed to be compatible with any updated versions of the program.

THE MODIFIABLE DATABASE

Company: Synergistic Software
Language: Basic
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $79.50
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	B–	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	B–	VISUAL APPEAL	B–		

THE MODIFIABLE DATABASE has been largely supplanted by a very flexible, feature-loaded package, "The Data Reporter". Although somewhat antiquated by its stream-lined competition it remains a solid, general purpose data management system. The stated price includes "Modifier Modules 1 & 2" ($25 apiece), which allow the basic system to perform expanded arithmetic and report function.

The features of the system consist of:

(1) SORT – up to three fields; 65 seconds max-time on three fields.
(2) CAPACITY – physically unlimited; can process multiple files as a single database; on line file in memory can range from 90 to 2,268 records, depending on File Size.
(3) PROTECTION – not protected, you may make backup copies of program disk.
(4) FILE ORGANIZATION – sequential with random update, search.
(5) FIELD SIZE – up to 49 characters per field, 22 fields per record.
(6) RECORD SIZE – 1,078 characters.
(7) RECORD SELECTION CAPABILITY – Field or string values, records, numeric range search.
(8) REPORTS – Columnar report output, horizontal and vertical totals, add/subtract/multiply/divide functions on fields, printing of left justified dollar sign for monetary fields, variable placement of output without headings for pre-printed formats.

Its advantages are:

(1) System and program is modifiable.
(2) Unlimited file size.
(3) Columnar or pre-printed format for printing.
(4) Field and string search capabilities for record selection.
(5) Up to three fields sort capability.

Its disadvantages are:

(1) Single user-generated module per report format.
(2) Fixed upper limits for field size and number of fields.
(3) No physical record deletion capability; record is flagged but remains on file.

TIME MANAGER

Company: Image Computer Products, Inc.
Language: Machine code
Hardware Requirements: Apple II or II + with 48K, Printer, clock, and lower case hardware adapter optional.

Department: Business
Sugg. Retail: $150
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	B+	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	N/A		

TIME MANAGER is a personal information and organization system, designed to be the first in a series of programs for managing business and personal affairs. This particular program is a daily organizer, accounting program, diary, and project coordinator with historical capabilities. It operates at two levels: by the month and by the day, covering the period from 1900 to 2155.

The manual for the program is well-constructed. It takes the user through the basics of using the program, followed by the expanded capabilities. Except for one instance where the manual states to use disk drive #1 for copying a data disk and the program correctly specifies drive #2, processing occurs just as described; a rare treat.

TIME MANAGER processing options consist of a priority, permanence, category and text portion. The priority may be *, 1, 2, 3, and 'Note'. The '*' allows the entry to move from day to day as part of a to-do list. These entries always appear on 'today's date'. The 'Note' priority is considered as the lowest level in the listing and may simply consist of reminders or diary items for record purposes.

The permanence entry setting is either on or off. Permanent entries will appear on the same date year after year. This makes it unnecessary to enter holidays every year.

Category is a letter designation from A to Z, assigned to each entry. This allows the user to sort entries and display only those that apply to a given situation. The user has the capability of specifying which letter applies to what category, although the program comes with 26 predefined types.

The entered text should be limited to 30 characters per entry; however, provisions are made for multiline entries. Unfortunately, full program capabilities are not available for such entries, so they should be avoided if possible.

Data disks can be defined for either 6-month or 12-month periods. With the 6-month disk, the user is allowed up to 256 entries; using the 12-month disk, 512 entries may be accommodated (assuming DOS 3.3). Starred entries are not considered in the specified limit, with 32 allowed. Up to 127 entries are allowed on a given day, displayed 16 at a time. Scrolling commands retrieve the entries on screen for display.

All entries may be modified as necessary, with convenient cursor movement and commands providing the editing functions.

If you want to define selection criteria for display of information, you are allowed to apply one or all of three filters: category, keywork, and/or priority. Only entries meeting the sum of the criteria that you have specified will be displayed. Only the selection criteria filters are set; you may then scan through the disk in a forward or backward direction to find the entry or entries you want.

An interesting and very useful function of TIME MANAGER is the totalling and accounting subsection. The user may establish up to nine different accounts which may be established and maintained. Totals are available in any or all of the accounts for a day, a month, or the current year. Or, running totals may be maintained for specific days or months. The user places the accounting information into the text portion of the entry preceded by special symbols designating the particular account. Multiple accounts may be reported in one single-line entry. Accounts can be given preset values for special applications.

Finally, you are allowed to create up to 12 notepads or screens full of data to serve as reminder. As one example, you can use many abbreviations in your entries and then create a notepad with the abbreviations defined so you don't forget them. Each notepad has 23 lines of 40 characters and there is a notepad editor for text entry.

Any of the program displays can be dumped to the printer by typing Ctrl-P, followed by the printer slot number. You may also print the entries for one or more days with a built-in printing command (/P). Printing will be governed by selection criteria if set. If you want, the program will also allow you to transfer data from the screen to a notepad. This might be particularly helpful for recording accounting information.

The program has special features that expand its capability if you have optional equipment. Three clock cards are supported: Thunderclock Plus, Mountain Computer, or California Computer Systems Clock. With these you do not have to enter the date at program start. With the clock you may also use the computer as an alarm clock by setting a buzzer.

Other features include the setting of program flags which infer to the program you are an expert, allowing you to use lower case as well as specifying other special features. There is a module which computes the interval between any two dates. And you have several move commands for manipulating data. Finally, there is a command which will show the program status at any time so you can see, for example, how many more starred entries are allowed.

When you pay for the program, you do not actually buy the program, but rather a license to use the program. In the event of termination of the license by either party, the entire package originally supplied must be returned to Image by the user — with no refund. There is a 90-day warranty on the diskette. A backup copy of the program diskette may be obtained (subject to the same license agreement) for $10. A reference card and disk with sample data completes the package.

THE DATA REPORTER

Company: Synergistic Software
Language: Applesoft, Machine
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $220.00
Availability: 7
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	A–	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

Synergistic Software has replaced its former file management system, "The Modifiable Database", with this flexible, three-function package. It includes: a data base manager (The Data Reporter, itself), also capable of producing pre-formatted reports and incorporating primarily the same format as the former system, TMD; a text editor capable of producing user-specified, free-form reports (The Report Generator); and a graphics formatter (The Analyzer/Plotter) for producing pie or bar charts plus dot or line graphs using the system's data base for statistical functions (i.e., x/y references for min/max, mean, standard deviation, and correlation coefficients).

The file structure is uniquely designed. The logical data base (all related records) are written to disk as separate files if the 2,168 byte capacity per logical file is exceeded. Synergistic Software claims this approach allows faster response for viewing, updating or correcting records; record retrieval is in fact very fast, which can be attributed to minimized disk-access time. However, the same principle applies in this system as it did for "The Modifiable Database": searching and sorting, as long as they are performed within the range of the records residing in memory, will still be optimally faster.

A feature not normally associated with file management systems for the Apple is thoughtfully provided in THE DATA REPORTER — upper/lower case input to the system. In order to display this capability, as to be expected, you will need a lower case adapter (Paymar, Lazer, et al). Although the disk is protected (for a nominal $5.00 remittance, they will send you a back-up copy when you mail in your registration card), the programs and files can be transferred to other disks as required. This means, nonetheless, that you will still need the original master to boot the system.

One seeming omission (a carry-over from "The Modifiable Database") is the lack of a report title option in the standard (default) format for report generation. This reviewer, however, received a cordial and more-than-cooperative response from Synergistic Software when he called to obtain some information on the memory limitation (HIMEM) specifications for programming this feature into the system. Their open-mindedness about suggested enhancements was also much appreciated.

The documentation is thorough and nicely-packaged, although a modicum of the inevitable, ubiquitous typos/misspellings are present (seemingly the ongoing condition involving all microcomputer documentation; and — self-effacingly, said he — probably not excluding this book and /or review). Synergistic Software has published an errata correction document, sent out on request, implying a thoroughly professional approach to a problem that is not that salient in its documentation.

Some of the system's vital statistics include:

(1) LOGICAL FILE SIZE — unlimited.
(2) PROTECTED — partially.
(3) FILE ORGANIZATION — random.
(4) FIELD SIZE — 50 bytes.
(5) FIELDS PER RECORD — 35.
(6) RECORD SIZE — 250 bytes.
(7) RECORD SELECTION — up to 20 levels.
(8) REPORT FEATURES — Horizontal columns, auto-formatting, arithmetic cross-footing, subtotals, summary reports, up to 3 sort fields.
(9) FIELD/RECORD REFORMATTING — with data intact.
(10) PASSWORD PROTECTION — with the Corvus' hard-disk version (Corvus feature).
(11) MAILING LABELS — yes.

There are many other serviceable features included in this package that can be utilized in processing the data base functions, the report generator and the plotter/analyzer in conjunction with each other that make this a very useful and flexible system for personal and small business applications. THE DATA REPORTER represents a good investment, with its multi-faceted capabilities.

DB MASTER

Company: Stoneware
Language: Applesoft & Machine
Hardware Requirements: 48K

Department: Database
Sugg. Retail: $230.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A–	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

DB MASTER is the most powerful of all the data base systems that we have reviewed. It allows the user enough flexibility to build almost any type of file and retrieve the data in almost any format.

Because it is so complex, it is also somewhat slower than some of the other offerings on the market; however, the added features that it affords make it worth the processing delay.

A big plus in the use of this system is that it includes password entry and offers three levels of protection to the user. This makes it ideal for use in an office environment where there is a need to limit access to certain portions of files. Since three levels of protection are offered, data can be accessed by a clerk through a predetermined level, while remaining sensitive information can be kept private at other levels.

After working with the program for awhile, the user will discover that DB MASTER is very powerful and easy to use. It also becomes apparent that a serious user must also have the "DB Utility Pack" for use in conjunction with DB MASTER. Any changes that need to be made to the file structure can only be done by use of the "Utility Pack", and if a disk is damaged (as one of ours was due to not following instruction), the "Utility Pack" will allow the data to be saved.

THE MANUAL

Once again, while we like the program, the manual leaves much to be desired. All of the information is there; it is just that in order to find it, several tours of the documentation are necessary. We found that the best way to make use of the program is for one person to become familiar with it and then teach the others who are going to use it.

Building files by following the book does result in successful completion of the task, but trying to format outputs for the printer is very awkward and, since the manual does not always agree with the screen menu, is most confusing until you get the hang of it. Trying to print labels, for example, from information provided in the documentation proves to be a major task until you eventually uncover several explanations about required steps that are listed in other sections of the manual.

THE PROGRAM

The system requires an Apple II or Apple II Plus with either Applesoft in ROM or a 16K or language card. It does not support any of the 80-column cards, but can be used with a modem to transfer files between systems when used in conjunction with the "Utility Pack". While the system will operate with only a single disk drive, two will add to the versatility and ease of the application; Stoneware recommends two in order to cut down on the number of disk swaps required.

Creating files is a simple process if the operator takes the time to preplan what data fields need to be entered. As with any data base, very careful planning is required.

In order to test the program's file creation ability, we built a data base of subscribers for our newsletter. This file contained over 600 files from which we used the master file to build various types of output reports. We ran labels for all subscribers; labels for those whose subscriptions expire next month, those who had paid, and those who had not. In other words, once we had entered all of the data, we were able to extract it in any way that we desired.

Since the program is so complex, disk access time and disk swapping takes what seem like a lot of time; however, when judged against the results, these functions do not seem as intricate as at first.

DB MASTER requires the use of many disks. Each file requires two blank disks, one for the file and one for the "utility" or file set-up information. In addition, it is necessary to keep several additional disks around for use during the sort operation and the formatting of the printer reports.

The program disk is solidly protected; only one of them is furnished with the package. However, Stoneware will provide a "free" back-up disk upon completion of the user registration.

Stoneware provides a "reset" protector with the package as well as screen layout forms for use in setting up a data base. Both of these enclosures make the system just that much more useable.

We are told that a hard disk version of the program will be available in the near future, although there are no current plans to allow operation in the 80-column mode.

The use of screen formatting allows the user to format a data base in a logical sequence and set up the screen for ease of data entry. Once you master the set-up instructions, building a file is simple. Sort keys allow the user to sort the files in a variety of ways. Additionally, "wild card" sorts and searches are allowed whereby you can search or sort on any character or group of characters within a field.

All in all, we believe that this package is the best microcomputer data base manager system we have seen on the market. The shortcomings that we have noted have to do with the editing functions of the files. As an example, in order to access an existing field for editing, you must complete the entire entry and then move to the editing mode. The other problem that we experienced involves the possibility of destroying the data on a disk by inserting the diskette at the wrong time. The screen prompts for disk swapping is hard to read and unless careful attention is paid to the display, the wrong disk can be inserted into the wrong drive. Although a warning is given after the disk swap and before initializing the disk, the drive number, name of disk required, and other information is presented in inverse display. Therein lies the problem, as the format is always the same no matter what disk or drive it is asking for.

All in all, this is a very fine state-of-the-art data base management system yet to be surpassed by others in the microcomputer field in terms of features and flexibility.

INFORMATION MASTER

Department: Data Base Management System
Company: High Technology, Inc.
Sugg. Retail: $150.00
Language: Applesoft, 6502
Availability: 6
Hardware Requirements: 48K
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	B+	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	B+		

INFORMATION MASTER is a very impressive, sophisticated data base management system. Although extensively menu-driven, the report format flexibility with its semi-screen-mapping is nicely designed. The concept of a trailer record for the total line, specification of multiple fields under one report header column and the voluminous useful options make this a very powerful system.

The documentation is somewhat difficult to use as a reference source once the tutorial is completed. The tutorial is very good in itself but sometimes the mechanics of the procedures over-emphasize the reasons or logic behind the methods. Two other High Tech products, "Transit" and "Data Master", lend flexibility in file formatting and compatibility with other systems.

1. PRICE – $150.00
2. SORT – Up to five sorts, with prioritized keys (six maximum) for sub-sorting.
3. CAPACITY – each record can contain up to 20 fields, with approximately 1,000 records per file within system design constraints.
4. PROTECTED – Yes.
5. FILE ORGANIZATION – Sequential Master File, consisting of system layout file (field definitions) and sort files. The data file itself is random access.
6. FIELD SIZE – Up to 99 characters per field.
7. POWERFUL FIELD COMPUTATION FEATURES – Using arithmetic operands, + and – signs for field entry, and a running sub-total display as each field is calculated.
8. VERY, POWERFUL REPORTING CAPABILITIES – full algebraic notation and formulae, plus constant entries on report lines. Additionally, report fields can be added or deleted from existing report formats by creating a new format that replaces the old one (using the same name).
9. RECORD SELECTION FEATURE – Partial string capability, record number selection.

- **ADVANTAGES**
  (a) Record checkpoint capability during update
  (b) Mailing label creation
  (c) Very, powerful arithmetic and calculation capabilities at file creation and report production time.
  (d) Dynamic report format, data file and sort file changes and/or deletions.
  (e) Excellent error trapping and diagnostic capabilities.
  (f) Global changes for a data file, as well as field duplication when creating files.
- **DISADVANTAGES**
  (a) No automatic report formatting capability
  (b) Multiple menu approach requires somewhat laborious procedures.

Overall, INFORMATION MASTER is a fine product which deserves careful consideration by a prospective buyer seeking a modest file management system. It has been surpassed by other packages since this system was last reviewed (1981 edition of THE BOOK) in terms of features (ISAM, full-screen mapping, etc.), but it still remains a very reliable although somewhat slow (particularly in the menu, retrieval and sort functions) work-horse.

THE GENERAL MANAGER

Company: On-Line Systems
Language: Applesoft
Hardware Requirements: Apple II or II + with disk. Printer helpful.

Department: Business
Sugg. Retail: $99.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	C+	RELIABILITY	B
EASE OF USE	B	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	N/A		

THE GENERAL MANAGER supports hierarchical data base organization. Simply put, this means that you are allowed to establish records that depend on other records, which in turn depend on other records, etc. The structure, if mapped out, would look like the organization chart of a business in which there is one master record (the parent) at the top and other records that branch out and are subordinate to the single master record (the offspring).

An example of such a data base structure as it relates to a school might consist of basic student information as the parent with offspring as billing information and grades. The billing information offspring might in turn include offspring of its own for overdue notices.

The system is very user friendly. If you have the language card or a 16K card, the program will load Applesoft and utilize the card's unused memory bank as available space in the main RAM for the data buffer. This is a nice touch which language card manufacturers could learn from regarding their requirements to first boot the master disk to load Applesoft.

The master menu allows you to change the parameters of your system (number of disk, printer slot, etc.); create/edit screens for data entry; initialize data disks; access data bases you have created; sort; reorganize the data base; print out the data base statistics; and run special user programs you might have written.

It is advisable to read the manual carefully when formatting your system. The program uses logical disk designations which may or may not conform with the way your system may be set up. The advantage of this is that you can have the program disk in any disk drive you want, but you must make certain that it is designated as logical disk "A" or the program won't recognize it. The On-Line folks have tried to make this procedure easy in that all screen messages that direct you to do something with a disk describe the actual slot, drive number, and disk volume number. The program will support up to four disk drives, although it will operate under a single drive with disk swapping. The manual states that Winchester type drives are also supported.

Screens are established by the user for each of the levels in the hierarchy. One screen per level is expected. Each screen (level) is identified with designated keys for sorting and linking each offspring screen to its origin. The screen may display information that is common to the parent or other offspring; if so, that information will be automatically forwarded and entered into the offspring at time of data entry. It is not necessary to enter data into all screens at one time. By using unique keys you can locate any parent and offspring and then enter other information as required. At least, that is what the manual says you should be able to do. Unfortunately, when this feature was tried, following the directions in the manual, a fatal error #22 (RETURN without GOSUB) occurred in line 7160 of the program. Hopefully, that will be fixed as part of On-Line's support. (The error handling routine trapped the error, however, and recovery was excellent!)

All of the standard data base features of entering and modifying data are supported. Fields within each record can be formatted as the user desires and special formats such as phone number, etc. are supported. Computations within and between screens are supported as a nicely-implemented added feature.

When searching for a record, you may apply selection criteria which include the standard logical functions as well as range and exclusion.

Another powrful and handy feature of THE GENERAL MANAGER is its ability to reorganize the data base any time the user requires. Fields can be added, deleted, or changed in length at will; the program will account for those changes during the reorganization process. Also, during the reorganization process, the data base pointers and records are realigned for better disk access.

In addition to all the foregoing niceties, THE GENERAL MANAGER allows you to interface to user-written Applesoft programs to do things that the master program will not directly accomplish. To make things considerably easier, the manual describes the enhancements which the program authors have made to Applesoft, showing you how to access user programs through use of the ampersand (&). Some extra commands that add processing enhancements are: &OPEN, to open a data base; &INFO, which yields information about field locations; &RECIN, which reads data from a particular screen into a data array; &FIND, to locate a particular record by defined selection criteria; &OUTFLD, which fills in computed output only fields (those which the program fills in form other data in the data base). A sample invoice program is included on the program disk.

Several applications are described in the last chapter of the manual along with appropriate appendices that summarize all commands.

Multiple disks for a single data base are supported by THE GENERAL MANAGER. Other techniques, such as variable length records, are used to reduce the amount of space required by data on the disks.

THE GENERAL MANAGER is a good addition to the growing number of data base managers. Its flexibility in transferring data from one screen to another and using this data for output field calculations, along with the ability to interface with user written programs, make this a very useful program — however, you should know what you are doing before using all this flexibility. Because of its inherent flexibility, it is comparatively easy to lose input data or completely destroy your data base; this seems to be a trade-off one has to consider if versatility and open-endedness is desired in a data base software package.

SUPERSORT [Rev. 1.5]

Company: MicroPro International Corp.
Language: Z-80 Machine Code
Hardware Requirements: 48K Apple II or II + with Z-80 card

Department: Business
Sugg. Retail: $250.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	**A –**	DOCUMENTATION	**B**	RELIABILITY	**A**
EASE OF USE	**B**	VALUE FOR MONEY	**A –**	ERROR HANDLING	**A**
VENDOR SUPPORT	**A**	VISUAL APPEAL	**N/A**		

SUPERSORT is an extremely flexible tool for data file manipulation covering a wide range of applications. Sorting, merging, and record selection functions are carried out on files compatible with a wide variety of languages operating under CP/M or a similar operating system.

The program is configured to sort up to 32 input files and merge them into a single output file as required. If there are 32 pre-sorted files for merging, they will read as input, within system limitations or constraints (memory is the main limitation). Sorting and merging of input files is specified in the same run for greater efficiency. Record selections, file conversions and other features of the program can be used independently of the sorting and merging process.

SUPERSORT input files may contain ASCII, BCD, and/or binary data with logical record lengths up to 4096 characters. The records may be 1) fixed length, 2) variable length with a carriage return as the delimiter or with the length specified at the beginning, or 3) COBOL relative files.

Fields used as sort keys for testing record selection may have either a fixed column specified position and length or a variable comma-delimited position and length. This allows the maximum flexibility.

SUPERSORT allows up to 32 key fields; each may be specified as ascending or descending sequence with different data type attributes. The key fields may be further designated as ASCII, BCD or binary formats.

A nice design feature is the use of numeric ASCII options sorts on all free format numbers, including exponential notation. For those using FORTRAN or BASIC to create files that require sorting, this means that most print formats are supported.

Binary data types handled include fixed-point for any length, signed or unsigned, stored as low-high or high-low; additionally, MicroSoft floating point, single or double precision is supported. These include the integer plus single and double precision real data types conforming to MicroSoft MBASIC and FORTRAN specifications.

Some of the specific options supported are EBCDIC characters, processing lower case as upper case, treating the last rather than the first character of a key as most significant, and ignoring the high order (parity) bit.

Record selection is extremely flexible and powerful. Records may be selected or excluded. Any number of conditional tests may be made on any field against a specified value or range of values or against another field in the same record. Values for the test may be specified as text strings, BCD numbers, or binary values in octal, decimal, or hexadecimal.

All of the usual test operators such as less than, equal to, greater than, etc. are supported. In addition, there are two other operators: between and not between, which serve as range testing for values. These tests may also be combined with AND, OR, and EXCLUSIVE OR operators.

There are some added features that can be useful to the regular user of SUPERSORT. The beginning and ending record numbers for each sort input file may be specified for selective processing. You also may change the output disc for added processing capability with smaller computer systems.

Another option that helps reduce disc use is a tagging option wherein only pointers to records are used during sorting and merging. The records are then retrieved via a high speed random access algorithm for writing to the output file.

Printouts at the console can be a simple "it's done" type of message to a full breakout of what was done, including disc space usage.

With the record selection capabilities of SUPERSORT, you may also perform file conversion functions; for example, converting fixed length records to records with comma delimiters. Fields within the records may also be rearranged with simultaneous sorting if needed.

A particularly useful feature of SUPERSORT, particularly involving utilizing "DataStar", is the ability to create a key index file. With this feature you may use "WordStar" to globally change some feature of the database and then use SUPERSORT to recreate the index file. This is particularly useful when you change the input form with the "DataStar" program. Record numbers are also available for creating multiple keys.

In addition, the sector number and byte offset at which each record begins are available as yet another method of creating an index.

Operation of the program is by either interactive keyboard command mode or by use of a command file for often-used sequences of operations. In addition, SUPERSORT is provided in relocatable object code for use as a subroutine in FORTRAN, COBOL, or assembled programs. The relocatable code may be modified to delete unneeded features to help in memory-limited systems.

SUPERSORT uses a heapsort algorithm with modifications to adjust internal memory allocation, input/output buffer sizes, and other variables in response to the job at hand. With large amounts of RAM there will be less disc activity than with smaller amounts of RAM.

The manual states a speed benchmark of 560 records per minute has been realized using CP/M with single density diskettes and a 48K system with an input file containing 1000 80-character records and one 10-character key. Because of the nature of the dynamic reallocation based on the system, no attempt was made to verify that or provide alternate speed data.

The program may be provided in one of three forms: I, II, or III. Version I has all capabilities. Version II comes without the relocatable code. Version III comes without the relocatable code and without select and exclude commands so you will not be able to extract records on the basis of tests. Be certain that you get the version you require. Version I was the reviewed copy.

SUPERSORT was found to be extremely flexible with many capabilities; so many, in fact, that this reviewer would not normally have a use for them all and had to spend a great deal of time checking most. The program is easy to use with some practice; however, do not expect to pick it up, put it in the disc drive and run it without studying the manual somewhat extensively. It is **not** an easy program to use without some attention and practice.

If you have and use programs like "DataStar" and "WordStar" for data manipulation, you probably should consider the addition of SUPERSORT. If you don't have to manipulate large amounts of data regularly, the program is probably too powerful for you. Your requirements will dictate its best use.

THE PERSONAL SECRETARY

Department: Business
Company: Sof/Sys, Inc.
Sugg. Retail: $99.95
Language: Applesoft
Availability: 6
Hardware Requirements: 48K Apple II or II+, printer.
Disk: Disk*
A lower case adaptor chip and shiftwire mod are supplied for rev 7 and later Apples.

OVERALL RATING	**B+**	DOCUMENTATION	**C**	RELIABILITY	**A–**
EASE OF USE	**B**	VALUE FOR MONEY	**A–**	ERROR HANDLING	**A**
VENDOR SUPPORT	**N/A**	VISUAL APPEAL	**N/A**		

The Personal Secretary is a low-end version of the *Executive Secretary*, a complete word processing and simple data base management system. Like its parent, *The Personal Secretary* contains a complete document editor, a print program, and a built-in mailing list data base system. All files are upward compatible with the *Executive Secretary*.

The program uses the 40-character Apple screen. Wordwrap occurs on text entry and editing with formatting. Both result at print time. Cursor control is easy, using the arrows (CR), and "/" key diamond. Text entry is like a typewriter if you have installed the shiftkey mod wire. The program will work without that, but getting capital letters is awkward, since CTRL-L must be pressed before and after the letter. Better to install the mod; it's easy enough.

All standard editor functions are present, including search and replace. As in the *Executive Secretary*, the search and replace function operates in a strange manner. When searching a file for the single letter "t" in order to replace it with the string "aa," all were found, but not in the order that they appeared. The program found approximately every third letter on a single pass and then went back to the beginning and started over again. Three passes were necessary to catch all. This is not a real problem for short files, but can get discouraging on long ones. All other editing functions worked well, and I judged them generally easy to use.

Almost anything that your printer can do, this program will support in one way or another. The manner in which this is done is worthy of note. Using dot commands (a period followed by two letters), you may define any type of printer command. For example, if you have a Diablo 1620, the sequence ESC-A will change to the red ribbon. If, on the other hand, you define ".cl" (for color), then any time you use ".cl" in your text the printer will print the characters following in red. (Don't forget to define the ESC-B sequence so you can get back to black.)

Another useful feature of this word processor is the ability to use conditionals in your text. With this, you can use portions of your card files (also created by *The Personal Secretary)* to define the final text product. One example of this would be for sending thank you letters to contributors. Depending upon the amount donated, the letter would have varying items of praise for the contributor and his/her ancestors. (This is a feature that I wish my *WordStar* had.)

The card file built into the program has room for 299 cards per file and also has search and sort capabilities. The cards are limited to a fixed number of entries, but these are sufficient for a reasonably complete mailing list with comments. Lines from these card files may be inserted into text at print time, allowing for a complete mail-merge capability. Using the comment sections of the file, the conditionals described above allow for a powerful system.

The Personal Secretary is a good addition to the low-end word processor market. It has some quirks that you must get used to and a manual which could stand considerable improvement; but for the price, this package will provide a very complete system. Consider it.

DB MASTER UTILITY PAK #1

Department: Business
Company: Stoneware Microcomputer Products
Sugg. Retail: $99
Language: Applesoft
Availability: 7
Hardware Requirements: n se with DB Master except two disk drives are mandatory. Requires DB Master Revision #3.0.
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B+	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	N/A		

The DB MASTER UTILITY PAK #1 is an extension of the basic "DB Master" program. It adds the capability to merge and recover files as well as translate files between the "DB Master" file format and the Data Interchange Format (DIF), as used by many other programs. In effect, with the translator, "DB Master" files may now be used in other applications.

Before buying this support package, the buyer should insist on opening the package and reading the instructions. Many of the programs in the package have restrictions associated with their use — too many to list here, although we will attempt to identify the major ones.

The first restriction that applies to all programs is the need for two-disk drives. Although a two disk drive system is the best configuration for "DB Master", it may not be a problem for most; however, it is appropriate that the potential user be made aware of the optimum use of the system. Another suggestion that will save time is to have a copy of your current file statistics in hand before attempting any of the file operations. In many cases you will need them and cannot access them in the program at the point when the system asks for them. If you get into one of these situations, the only way out is to back out of the program to a point where you can retrieve the statistics; a time-consuming process. Finally, in the general warning category, the UTILITY PAK does not maintain secondary keys when using merge or modify operations. You must rebuild them for any file written to by the UTILITY PAK modules.

A final warning relates to the misuse of the UTILITY PAK. Some examples provided will yield some "bizarre results", such as: merging dissimilar files with the same name, recovering a master file using another file's utility diskette, or translating incorrectly-formatted data back to the DB Master file.

In short, before using this program package — BACK UP YOUR DATA!!!

The restructure program allows changing of file formats. You can change the primary key fields, delete fields, add fields, add a screen page, change screen location of fields, change the field label, or change the field type. In essence, the program creates a new file with all or selected data on a new set of diskettes. Of course, report formats, short forms, and other auxiliary functions will not be transferred across. Take care if you change the primary key. If you do, and consequently create duplicate keys, you may lose some of the records; only the first record that the program finds with an identical key is moved.

The replicate option creates a new file with all report formats, short forms, etc., but with no data. Both the master and utility disks are created. The new file contains no secondary keys; however, if fields are designated as secondary keys, they will be built as you add data. This utility is best used for creating new file disks at the start of any accounting period while using the original disks for the historical file.

The merge option is quite useful but also quite dangerous to use. Here is where you really need to know your file structure. In brief, any records from different files with the same formats are merged. If the files are not matched, you are likely to lose data. Here is where a backup of the files you are operating on becomes very useful. You are given the option of merging all records or selected records. In addition, you can delete merged records from the original file and/or overwrite any duplicate keys in the destination file.

If you have a problem with one of your disks, you can use the recover module. Before you can recover a crashed data disk, you must have an intact utility disk — another reason to BACK UP your disks. Lacking the utility disk, you can recreate one with the proper file structure; however, if the record structure is not exact, the records will not be recovered.

Of particular interest in the UTILITY PAK is the ability to transfer information from DB Master files to the DIF and back again — making it possible to use "DB Master" information in other applications. In testing this utility, a "DB Master" file with several field types was successfully transferred to "VisiCalc". Transferring the "VisiCalc" file back would have required a Basic program and was not tested.

If you use the file transfer utility, make certain that you follow the format in the DIF specification module exactly. If not, there can be a problem in the transfer. The transfer module will take care of this while going from "DB Master" to DIF, but you must make certain that it processes correctly while performing the reverse procedure.

Another area to watch out for in the transfer procedure from "DB Master" to DIF is the expansion of the data. The DIF is not an efficient method of storing data so if your "DB Master" disk is quite full, two disk may be necessary for the transfer file — and you may lose some data in the disk switch.

A Software Arts Technical Note which gives the specifics of the DIF is included with the package.

The UTILITY PAK #1 is a useful addition to "DB Master" and should be considered by users who do a significant amount of work with the program. Other users of the UTILITY PAK would be those who require graphical representation of their data. Using the DIF, data transfer is allowed to an analysis program such as VISIPLOT/VISITREND for graphical display and statistical analysis. The only caution this reviewer would offer is to read the instructions very carefully several times before starting and BACK UP your data disks before operating them.

MDBS.DMS/MDBS.DDL

Department: Business
Company: Micro Data Base Systems, Inc.
Sugg. Retail: Varies [1]
Language: MBASIC under CP/M [2]
Availability: 3
Hardware Requirements: Apple II or II + with Z-80 card and Pascal card or 16K card [3], 2 Disk Drives
Disk: Disk

NOTES:
[1] Price varies between $600 and $1,500 depending upon the exact configuration ordered.
[2] The program is written in machine language and links to your resident language. Versions will also be available for Applesoft and 6502 machine language soon.
[3] Program will not run without the extra 16K.

OVERALL RATING	C	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

These ratings relate to the average non-business user. Comments for the business user may be found in the text.

The MDBS.DMS and related programs represent the only true data base management system available today for the Apple II computer. Every other program currently available handles only file management as opposed to data base management. The main difference between the two is the ability of the data base management system to link various entries in the data base to other members in any defined way. In this way, a data base management system handles selective retrieval for "what if" types of inquiries. A file management system only retrieves selected predefined items and cannot handle "what if" kinds of questions.

The basic package reviewed here has a component for defining data structures (MDBS.DDL) and for the storage and retrieval of data (MDBS.DMS). Add-on packages are available for MDBS to allow the logging of transactions for recovery in case of problems (MDBS.RTL), restructuring of a data base (MDBS.DRS), and query handling (MDBS.QRS). The specific packages ordered determine the exact price paid for the software.

The major difference between this system and other programs available lies in the need to do everything yourself for running MDBS. The package provided links to your host language and all applications are controlled through specifically constructed CALL statements. Unless the user has intimate knowledge of the host language and the application(s) desired, this system will be useless. It is NOT a stand-alone package.

For each application, the first thing that must be done is to define the data base logical structure. In this formal definition, the relationship between the data elements is presented. The process consists of grouping data items into record types (logical files) and then indicating any relationships between the record types. Because the relationships are only conceptual and do not imply any physical storage allocation, the structure can be quite complex with many interrelationships.

After the structure is defined, application programs can be written to access the data in the data base. This program does not read or write directly; instead, special CALL statements are used which asks the data management routines to perform the necessary operations. The author of the application program only needs to know the conceptual structure of the data base; the system maintains the physical structure.

In the programs provided, there is no capability to modify a data base structure once developed. Add-on units are available to do this at added cost.

The documentation provided with the package is quite complete and seems to cover every command along with contingencies for what could go wrong during execution of that command. Each command executes a particular function and returns an error code that can be interpreted by the application program. In addition to the extensive user's manual, there is a "Primer on Data Base Management Systems" and a language specific manual for linking the system to the specific host language.

The linked language and data base management system consume a considerable amount of memory in the Apple II. Only a few thousand bytes are left for applications with the 16K card in place; the program simply is not useful without the card. This greatly limits the scope of any individual application program; however, it is possible to use the CHAIN function of MBASIC to link several small programs under the control of an executive. If the program could be made to run with the expanded memory capability of the Apple III, then larger applications programs could be constructed and run with extensive buffering to reduce disk access. This would provide a powerful system for business use; better than many mainframe systems.

The program was not easy to initiate with the instructions provided. The instructions were written with most CP/M systems in mind and did not take into account the peculiar structure of the Apple II CP/M. The Apple II CP/M configuration more severely limits the memory available for use. When DBMS was loaded at the suggested location, the SAMPLE program would not load. Moving the language to a different location as suggested resulted in a configuration that would load but would not run correctly. The ultimate solution involved splitting the SAMPLE program into three smaller segments and running each segment for the different tasks of entering data into the data base, finding specific data, and printing the data base. Determining that this was necessary was not included in the instructions and required much reading of the instructions and several phone calls to the vendor. The system did eventually work; and quite well, once the memory restrictions were overcome.

Data provided with the system indicated that this particular version of the system was about to be replaced with version 3.0. The new version will have more streamlined processing and better procedures for faster data recovery. One problem with this is that the new version will not be upward compatible with the current version. The data file structures will be able to be used, but the actual data base will have to be reentered manually. At the prices charged for this software package, automatic updating capability should be provided.

In summary, this system is an excellent data base management system, but it will appeal only to users with large data bases that have many interrelationships. The average user will have little use for this product except perhaps as an expensive programming curiosity.

BOWLING DATA SYSTEM

Company: Rainbow Computing
Language: Applesoft
Hardware Requirements: 32K, ROM Applesoft, Disk Drive [1], Printer

Department: Business
Sugg. Retail: $79.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	B		

The BOWLING DATA SYSTEM is a highly specialized and tightly -structured data base system. Complete league records and reports of up to 40 teams, with 275 regular and substitute bowlers may be maintained and generated for a season as long as 40 weeks. An impressive report generation capability includes complete team and individual standings with a minimum of update hassle using program generated weekly scoresheet forms. Standings, pairings, lane assignments, and handicap computations are all easily and thoroughly accommodated using a single disk drive.

As with any data base system, the one-time input data requirements entail considerable time and effort. An excellent job has been done of making this task as painless as possible. The clearly-written documentation leads the "new computer user," for whom this system seems obviously targeted, through a step-by-step input, review and correction process. The weekly maintenance data entry process is also well handled. An especially nice learning feature which other DB systems should take to heart allows the new user to duplicate, "update," and play with the sample data base and reports shown in the documentation, since the data are all included on the disk.

APPLE II DATA BASE PACKAGE COMPARISON

I — GENERAL INFORMATION

NAME	COMPANY	PRICE	MIN. HARDWARE/SOFTWARE
DATADEX	INFORMATION UNLIMITED SOFTWARE	$250.00*	48K, DISK, APPLESOFT
DBMASTER	STONEWARE	$189.00	48K, DISK, MACHINE LANGUAGE
CCA	PERSONAL SOFTWARE	$ 99.00	32K, DISK, APPLESOFT
CIF	MICRO-SPARC	$ 39.95	48K, DISK, APPLESOFT
INFORMATION MASTER	HIGH TECHNOLOGY	$150.00	48K, DISK, APPLESOFT

II — FEATURES

	DATADEX	DBMASTER	CCA	CIF	INFO. MSTR.
LOGICAL FILE SIZE	UNLIMITED	UNLIMITED	1 DISK	1 DISK	1,000
PROTECTED	Y	Y	N	N	Y
FILE ORGANIZATION/ RETRIEVAL [1]	R/S,R,I	R,H/S,R,I	R/S,R,I	R/S,R	R/S,R
FIELD SIZE [CHARACTERS]	36	30	UNSPECIFIED	UNSPECIFIED	99
FIELDS PER RECORD	50	100	24	20	20
RECORD SIZE [CHARACTERS]	239	1020	250	UNSPECIFIED	1,980
RECORD SELECTION	Y	Y	Y	Y	Y
REPORT FEATURES					
• HORIZONTAL COLS	Y	Y	Y	Y	Y
• AUTO FORMATTING	Y	N	Y	Y	N
• MATH CROSS-FOOTING	Y	Y	Y	Y	Y[4]
• SUBTOTALS	Y	Y	Y	Y	Y
• SUMMARY REPORTS	Y	Y	N	Y	N
• SORT FIELDS	6	6	10	1	5
FIELD/RECORD REFORMATTING	Y	Y	Y[3]	N	Y[3]
PASSWORD PROTECTION	Y	Y	N	N	N
MAILING LABELS	Y	Y	N	N	N
PURGE/COMPACT RECORDS	Y	Y	Y	N	Y
CHECKPOINT PROCESSING	Y	Y	Y	N	Y
MEMORY MAPPING	Y	Y	Y[3]	N	N

[1]R = RANDOM, S = SEQUENTIAL, I = INDEXED SEQUENTIAL
[2] PSEUDO—HIERARCHICAL [TREE-STRUCTURE] EMULATION
[3] OPTIONAL PACKAGE
[4] MULTIPLIGATION AND ADDITION ONLY
[5] WITH MODIFIER #1 PACKAGE
[6] WITH MODIFIER #2 PACKAGE
[7]WITH REPORTER PACKAGE
[8] DEPENDENT ON ITEMS IN COLUMN 1 AND 2 ON SCREEN
[9] SCREEN FORMATTED
[10] REQUIRES COMBINING 6 MULTIPLE FIELDS [CITY, STATE, ZIP] IN ONE FIELD

APPLE II DATA BASE PACKAGE COMPARISON

I — GENERAL INFORMATION

NAME	COMPANY	PRICE	MIN. HARDWARE/SOFTWARE
MODIFIABLE DATA BASE	SYNERGISTIC SOFTWARE	$ 49.50*	48K, DISK, APPLESOFT
PFS	SOFTWARE PUBLISHING CORP.	$ 99.95	(PROCESSOR) 48K, DISK, RUN TIME PASCAL
		$ 99.95	(REPORTER) 48K, DISK, RUN-TIME PASCAL
VISIDEX	PERSONAL SOFTWARE	$190.00	48K, DISK, MACHINE LANGUAGE
DATA FACTORY 4.0	MICRO LAB	$150.00	48K, DISK, APPLESOFT
INFORMATION MASTER	HIGH TECHNOLOGY	$150.00	48K, DISK, APPLESOFT

*WITHOUT MODIFIER #2 ($15.00) AND MODIFIER #2 ($15.00) REPORT PACKAGES

II — FEATURES

	MOD. D.B.	PFS	VISIDEX	D. FACT. 4.0
LOGICAL FILE SIZE (DISK OR RECORDS)	2,268	1 DISK	UNLIMITED	1 DISK
PROTECTED	N	Y	Y	Y
FILE ORGANIZATION/ RETRIEVAL (1)	R/S,R	R/S,R,I	R/S,R,I	R/S,R,I
FIELD SIZE (CHARACTERS)	49	UNSPECIFIED	UNSPECIFIED	239
FIELDS PER RECORD	22	UNSPECIFIED	UNSPECIFIED	239
RECORD SIZE (CHARACTERS)	1,078	UNSPEIFIED	UNSPECIFIED	21,032
RECORD SELECTION	Y	Y	Y	Y
REPORT FEATURES				
• HORIZONTAL COLS	Y(5)	Y	Y(9)	Y
• AUTO FORMATTING	N	Y(7)	N	N
• MATH CROSS-FOOTING	Y(5)	Y(7)	N	Y
• SUBTOTALS	N	Y(7)	N	Y
• SUMMARY REPORTS	N	N	N	N
• SORT FIELDS	3	2 + (7)(8)	UNSPECIFIED	20
FIELD/RECORD REFORMATTING	N	N	N	Y
PASSWORD PROTECTION	N	N	N	N
MAILING LABELS	N	Y	Y	Y(10)
PURGE/COMPACT RECORDS	N	Y	Y	Y
CHECKPOINT PROCESSING	N	Y	Y	Y
MEMORY MAPPING	N	Y	Y	N

(1)R = RANDOM, S = SEQUENTIAL, I = INDEXED SEQUENTIAL
(2) PSEUDO—HIERARCHICAL (TREE-STRUCTURE) EMULATION
(3) OPTIONAL PACKAGE
(4) MULTIPLICATION AND ADDITION ONLY
(5) WITH MODIFIER #1 PACKAGE
(6) WITH MODIFIER #2 PACKAGE
(7)WITH REPORTER PACKAGE
(8) DEPENDENT ON ITEMS IN COLUMN 1 AND 2 ON SCREEN
(9) SCREEN FORMATTED
(10) REQUIRES COMBINING 6 MULTIPLE FIELDS (CITY, STATE, ZIP) IN ONE FIELD

STOCK MARKET PROGRAMS

THE PERSONAL INVESTOR

Company: PBL Corporation
Language: Unspecified [Runtime Pascal?]
Hardware Requirements: 48K, 1 or 2 Drives, and a D.C. Hayes Micromodem or Apple Communications Card and acoustic modem

Department: Business
Sugg. Retail: $95.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	B
EASE OF USE	A–	VALUE FOR MONEY	B+	ERROR HANDLING	B
VENDOR SUPPORT	B+	VISUAL APPEAL	B+		

The Personal Investor is a stock portfolio management program with a built-in capability to communicate with the Dow Jones News/Retrieval Service. It can retrieve business news, update (via current prices) the value of stocks in the portfolio, and retrieve quotes for any other stocks in a pre-assigned list. The program does not retrieve or store historical price information, nor does it include any charting capabilities. Current price information can, with some difficulty, be entered in manually.

With a second disk drive to hold the data diskette, the program allows storing current price and dividend information on up to 300 stocks, with up to 600 purchases and 500 sales on a single diskette. For more capacity, you can start additional data diskettes. When a stock is entered but not purchased, the program will automatically collect quotes from the Dow Jones service, but these will not appear in portfolio reports.

A significant limitation of the program for the serious stock market investor is that it only handles actual cash purchases and stock sales (i.e. long positions). There are no provisions for margin calculations, or buying or selling options. Nor are provisions made for selling short or writing covered options on stock you already own. It does handle multiple purchases of the same stock very nicely, as well as stock splits (incorrectly entered stock splits can even be "backed out" by entering the split backwards).

The program produces four reports: a Tax Report showing long and short term gains realized from purchase and sale of stocks, a Description and Price Report showing what stocks are in the portfolio together with the most current price information, a Gain/Loss Report showing the unrealized gain or loss for your holdings based on the most recently entered price, and a Dividend Report showing dividend dates, projected dividends and dividend yields. Unfortunately the organization and content of these reports is very questionable. Perhaps in order to insure that an 80-column printer is adequate, several reports are too brief. For example, the number of shares purchased or sold is missing from both the Tax Report and the Gain/Loss Report. There are also no reports to "trigger" forthcoming important events, such as stocks going long-term or x-dividend.

The user interface for this program is very nicely done. The menus are well organized and easy to follow; data can be entered and changed quite easily. There is a heavy emphasis on using special characters rather than additional menus to make selections (e.g. "!," "$," "&," to signify "split," "sell," and "delete"), but the options are always spelled out on the screen and it all works well. Additional features include a "cursor calculator," which allows basic math manipulations while entering data values, and the ability to either clear out previous transactions completely, or retain a summary if desired. Another nifty technique allows you to handle commissions either by ignoring them, entering them as a percent, or entering them as dollars.

The documentation is quite thorough and readable, with plenty of pictures of screen formats, and a good index. There is no sample data disk, but the manual leads you through several adequate examples.

The program appears to be written in Runtime Pascal, and this implies at least two important consequences for this reviewer. First, it simply did not operate properly on a system which includes a Smarterm 80-column card. More precisely in this case, the program video output was not visible at all on the normal video monitor. When the 80-column card was removed, the program functioned normally. Second, the printer has very rigid slot requirements for those which hold your printer interface and modem (slot 1 and 2, respectively). The program disk itself is copyable for backup purposes.

In summary, if your stock trades are relatively long, you don't trade options, and you wish to access the Dow Jones News/Retrieval Service, then this may be the program for you.

APPLE PORTFOLIO EVALUATOR

Company: Apple Computer, Inc.
Language: Applesoft
Hardware Requirements: 48K, printer, an a modem peripheral card or Apple Communications Card and acoustic modem

Department: Business
Sugg. Retail: $50.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	C–	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	C–	ERROR HANDLING	C
VENDOR SUPPORT	C	VISUAL APPEAL	C		

Apple Computer's *Apple Portfolio Evaluator* (Dow Jones Series) is a program designed to help you maintain and keep current a record of one or more stock portfolios. This program can access the Dow Jones News/Retrieval Service to obtain current prices for the stocks in your portfolio, and in fact must do so in order to obtain an up-to-date evaluation of a portfolio. There is no provision whatsoever for manually updating the current prices for your stocks. No historical price information is recorded, nor is any charting capability included.

Portfolio information is stored right on your program diskette; there is room to store up to about 100 portfolios, each with up to 50 stocks.

This program is a primitive example of portfolio management by personal computer — the program has been marketed essentially unchanged since about 1979. It does have the bare-bones capabilities to enter stock purchases, calculate the current portfolio value, and show short and long-term gains and/or losses. However, there is no distinction between realized and unrealized gains and losses. That is, once a stock is purchased, it appears forever as part of the current portfolio until it is deleted entirely from the system. This "deletion" presumably constitutes sale of the stock, but then no record is kept of the gain or loss so realized, and so no assistance is provided at tax time. Otherwise, most notable are all of the desirable features which are *not* present in this program. There are no provisions for options, short sales, bonds, stock splits, cash or stock dividends, yield calculations, margin purchases or interest expenses. There are no reports to "trigger" forthcoming important events like stocks going long-term. And, perhaps most important of all, is the regrettable omission of any capability to manually update the price of a stock, forcing dependency on telephone access to the update service.

The program itself is easy enough to use, as far as it goes. There are rigid slot requirements: your modem must be in slot 2 and your printer must be in slot 1.

In short, this program was an early attempt to put the Apple to work in a useful business-oriented application. However, as time has passed, the sophistication of such software tools has increased by leaps and bounds. Now this program has really very little to recommend it, save a very modest price, the ability to automatically obtain quotes, and some elementary if incomplete bookkeeping functions.

DOW JONES NEWS/RETRIEVAL SERVICE

Company: Apple Computer
Language: Applesoft
Hardware Requirements: 48K and modem

Department: Business
Sugg. Retail: $99.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	A–	DOCUMENTATION	B+	RELIABILITY	B
EASE OF USE	B+	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	B+	VISUAL APPEAL	B+		

Throw away the scissors and paste. If you are like many investors (save for the technicians), you probably like to keep a file for information pertaining to securities that you own or are interested in following. With the electronic age, your Apple and Dow Jones can now perform this chore much more efficiently for you.

Via a modem and telephone access through your Apple, you may tap into the vast information library of Dow Jones, Inc. You may query information on any stock (or related subjects), and receive up-to-date notices from any Dow Jones publication, such as *The Wall Street Journal*, or *Barrons*. Data is compiled for the past 90 days, and information may also be had on the following: (1) Detailed financial facts on 3200 companies. e.g., revenue earnings, price changes, etc. (2) A summary of the week's top economic stories. (3) Transcripts from the popular financial show, "Wall Street Week." (4) Extracts from 10-K reports. (5) Sports, weather, and movie reviews. New services are continually being added.

The Dow Jones Database is a financial information wharehouse. It is an excellent investor/Apple owner source.

STOCK PORTFOLIO SYSTEM

Company: Smith Micro Software
Language: Applesoft
Hardware Requirements: 48K, 1 or 2 Drives

Department: Business
Sugg. Retail: $150.00
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	B–	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B–	VALUE FOR MONEY	B	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	C		

The *Stock Portfolio System* is a program for use in managing a stock and option portfolio. It allows the user to record puchases, sales, commissions, dividends and splits, and prints reports showing the resulting gains or losses. In addition, upon entering current price information for unsold holdings, the user may obtain a report showing the current value of his portfolio. The program does not provide for the storing of historical stock price information, and cannot be used to access any stock services via telephone.

This program is designed to allow you to record most common transactions involving your stock and option holdings. Only one portfolio can be stored on a data disk, and although no mention is made of how many transactions can be recorded over the course of a year, presumably the number is adequate since no historical price information is stored. There is an important provision for both cash and margin purchases. The program calculates the margin account equity, which you can also update by entering margin account interest expenses as well as money market interest income. You can record dividend payment schedules, as well as dividends actually received, both cash or stock. Stock splits can also be adequately reflected in your records. Option purchases and sales can be recorded, as well as any options you might write on your own stock.

The program produces some nicely designed reports, including current portfolio status (for which you manually enter an up-to-date price for each of your holdings), realized profits and losses on past transactions, dividend income, and interest expenses and income. Another useful feature allows you to flag important events which will occur in the upcoming 30 days (a variable term would have been nicer), such as stocks going long-term, dividends due to be paid, and expiring option contract. There is provision for transferring active stock records over to a new year, and the package includes a sample portfolio which can be used for practice in running the program.

This is a program which is fairly complete and adequate to the task it sets for itself. That is why one is saddened to note that this version suffers from a serious flaw in implementation. Specifically, the program mishandles the problem of allowing a user to correct mistakes as he types in data. After entering an entire screen of data, any errors in input must be corrected by retyping every item on the screen whether in error or not — dates, dollar amounts, numbers of shares — all of it must be retyped. According to the program's author, by the time this review is published, a revised version will be available in which this flaw has been corrected; and several other enhancements will have been incorporated, including the ability to update stock prices via telephone interface with the Dow Jones Service. It is upon the expectation of this revised version that the above ratings are based.

The program comes with a handsomely bound, but brief, 32-page manual printed by a dot-matrix printer. The program disk is protected from being copied by ordinary means, but a free backup is promised with the return of a signed license agreement.

SOAP (STOCK OPTION ANALYSIS)

Company: H & H Scientific
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $250.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A–	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	B+		

H & H Scientific has come out with a useful and reliable business package in the program *Soap*. With *Soap*, you may calculate and graph (with High Resolution graphics) anticipated profits or losses on option trading.

If you're an experienced investor, *Soap* can take care of a lot of the necessary record keeping associated with option trading. For the novice, the fact that you can set up a scenario and follow it through without risking a money investment, makes *Soap* a valuable learning tool.

The program is fairly straightforward in its approach, and relatively easy to use. Documentation is adequate, although one always hopes for more.

So for those investors already familiar with stock options, and novices interested in learning about them, *Soap* is definitely worth a look.

ANA I

Company: Galaxy
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $49.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	C+	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

While this program indicates its purpose as being a statistical analysis of Dow Jones Data, in actuality it can be used quite nicely as a general plotting package.

As designed, ANA 1 enables the user to perform analyses on data. You can put from 6 months to 5 years of data in one of 5 colors. After you have inputted your data, it is turned into what the author has termed transforms. These transforms are user specified moving averages; a least squares linear fit, filters for time, magnitude, or percentage changes; and user created relations between the DJI data, a transform, and a constant using +, =, −, ×, and / operations. The DL command enables you to draw a line between one and two points in graphics to indicate trend. The user may also "flip" back and forth between the full text page and the graph.

Given the first impression of a lot of commands and perhaps undue complexity, it was a nice surprise to find that the author thoughtfully provides a tutorial program which does a very competent job of familiarizing the new user with the program.

We would like to see more information on using the program to chart individual items, e.g., specific stocks.

COMPU-TRAC

Company: Personal Computer
Language: Applesoft
Hardware Requirements: See Below

Department: Business
Sugg. Retail: $1500 + $150 annually
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

COMPU-TRAC is composed of a group of traders in New Orleans, LA. What is provided is not "stand alone" commodity analysis but rather the software that will enable an Apple owner with the proper hardware to access on a daily basis their information in New Orleans. Via a modem hook-up the user may:

(1) Automatically access and gather daily data (open, high, low, close, volume and open interest).

(2) Obtain automatic distribution of daily data to cumulative history disks, each disk containing from six to eight contracts of your choice for the life of the contract. A disk stores 400 weeks of data (i.e., 2,000 days).

(3) Chart graphs — (displayed on your screen) which can be monthly, weekly or daily.

I have just attempted to hit the high points of this program. There is much more.

The best way to proceed in obtaining more information would be to contact the group directly. The company will provide you with an audio tape and a demonstration disk that does a good job of describing the program in detail.

For your demo, contact: Compu-Trac, 1221 Conery St., New Orleans, LA 70115.

HARDWARE REQUIREMENTS:

Apple II, 48K
2 Disk Drives
"Superchip"
Paper Tiger Printer
Apple Parallel Card
D.C. Hayes Micro-Modem or other modems.

PORTFOLIO MASTER 3.1

Company: Investors Software
Language: Applesoft
Hardware Requirements: 48K, 2 Drives, plus [for automatic retrieval of stock prices] D.C. Hayes Micromodem

Department: Business
Sugg. Retail: $195.00
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	B–	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	A–	VALUE FOR MONEY	B–	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B		

Portfolio Master 3.1 is a program designed to help manage a securities portfolio — that is, to record purchases and sales, compute gains and losses, keep track of option expiration dates, and evaluate current holdings. For the latter purpose, the program can access the Dow Jones News/Retrieval Service to obtain current prices for securities in the portfolio, or they can easily be entered in manually from other sources. No historical price information is recorded, nor is any charting capability included.

A single data disk can store many named securities' portfolios (just how many is not specified), each one consisting of purchase and sale information for up to 100 different securities. The program is designed to accept transactions involving any of a wide range of security types, including stocks (long and short positions), options, bonds, and even rights and warrants.

The program automatically maintains a CASH entry, and partially keeps track of changes in CASH due to purchases and sales. There is no direct provision for a margin account, however. Both stock splits and stock dividends can be recorded, but you cannot record covered options on your own stock.

The program allows you to print on-screen or with the printer several different 40-column reports showing gains and losses (both long and short-term), specific purchase and sales information, and expiration and/or maturity dates for options, bonds, T-bills, etc. Some nice features include summarizing securities by category, sorting by name within category, and showing, for each security or category, the percentage its value bears to the entire portfolio. In addition, there are two 80-column reports summarizing all the above information as either unrealized or realized gains and losses. Unfortunately, in including all types of securities in the same format (essentially a stock format), these reports afford only sketchy treatment of certain other types of securities. For example, they do not include option strike prices, or dividend and bond yields.

This program has a competent user interface. Menus are organized well enough, and data entry and correction is easy (however, prices can be entered only as decimals). It contains provisions for a variable printer and modem slots, as well as printer control functions and line feed control. A password and two different phone numbers can be stored for Dow Jones access.

The documentation consists of a small, 70-page manual which is quite readable as far as it goes, although it needs amplification (to include all menus and to discuss all input options). No sample reports are included, a serious omission. But a sample portfolio is provided with the program for experimentation. The program disk is protected from copying by ordinary means, but a free backup disk is promised upon return of a completed registration card.

This is a useful program, easy to use, and is general enough for the average investor. On the other hand, it might fall a little short of the needs of a professional securities analyst.

DOW JONES MARKET ANALYZER

Company: RTR Software, Inc.
Dow Jones & Co., Inc.
Language: Applesoft
Hardware Requirements: 48K, 1 or 2 Drives, plus [for automatic retrieval of stock prices] D.C. Hayes MicroModem or Apple Communications Card with modem

Department: Business
Sugg. Retail: $250.00
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	B	ERROR HANDLING	B
VENDOR SUPPORT	C	VISUAL APPEAL	B+		

The *Dow Jones Market Analyzer* is a comprehensive stock charting program for use in technical market analysis. It also includes capabilities for entering and maintaining a data base of stock price and volume data, either by manual entry, or by accessing the Dow Jones News/Retrieval Service. It does not include any capabilities for recording and managing a stock portfolio.

The program allows you to format a single diskette to store either 128 time units for up to 104 stocks, or 256 time units for up to 52 stocks. Multiple diskettes of information can be created, and the program allows easy movement from one data disk to another. For each time unit you may record: high, low, close, and volume. On startup (or for a new stock of interest), you can enter historical data either by accessing the Dow Jones service, or by a somewhat cumbersome system for manual entry. Subsequent daily updates can also be entered in either of those two ways.

Access to the Dow Jones service involves a two-step procedure by which quotes are first obtained and recorded on a temporary "work diskette," and then subsequently incorporated into one or more actual data diskettes. The program incorporates a simplified terminal module for this purpose, and permits storage of key telephone numbers and log-on information for rapid access to the service.

Page 2 of the user's manual asserts optimistically that the *"Dow Jones Market Analyzer* is a user-friendly program." In fact, the program seems a little complicated to use, and would benefit from a somewhat streamlined menu structure and a few small but important changes. For example, an unknown or incorrectly typed stock symbol forces the program back to the previous menu instead of asking for the input again; many menus include the perilously misleading "Exit Program" to simply revert back to the previous menu level, and "Quit," to instantly exit from the program back to BASIC: when manually entering historical price information, one has to count the intervals to be entered rather than signify completion with a null input, or the like.

Now for the good news: The charting capabilities themselves are excellent. They are very comprehensive, flexible, reasonably fast, highly user-interactive, and lend themselves to repetitive analysis of a single stock, or a group of *from two to five stocks*. You can plot simple stock prices and volumes, several types of moving averages (over user-specified intervals), and overlay with least-squares fit lines, trend lines, parallel lines, and speed-resistance lines. You can change plot scale horizontally or vertically, extend the plot over more time units, plot in semi-log scale, change line color, and save your plot to disk for later printing (additional software required). You can plot oscillator line and bar charts, and chart comparative strengths of a group of stocks.

A 120-page manual is included. It contains a kind of running commentary about what to type when, and a strictly verbal description of what you will see on the screen. This makes the manual very hard to follow unless you are running the program through each step while reading it. Surprisingly, there are no sample printouts of the charting options. There are a few pages on charting theory, a number of underlying formulas, and a nice index and bibliography.

The program itself uses a hardware protection scheme whereby a special device is supplied which must be plugged into your Apple's game I/O port in order to run the program. This would be a serious drawback, except that an extension port with a zero-insertion-force socket is also supplied to allow you to do this outside your computer with almost no effort at all. You may then make your own backup copies of the program or its data disks using standard copy routines.

To summarize, if you overlook a few unfortunate flaws in the program operation and its manual, this package can be a very useful tool in the hands of a serious stock market charter.

STOCK TRACKER

Company: H & H Trading Co.
Language: Applesoft
Hardware Requirements: 48K & Applesoft in ROM

Department: Business
Sugg. Retail: $150.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

This stock tracking system is based on Joseph Granville's Theory of On-Balance Volume. This theory states that volume patterns will precede price patterns.

Having traded stocks for a number of years as well as at one time being a floor trader on the American Stock Exchange, I will state that, from experience, this theory is generally valid. In most instances, someone knows something or has an opinion on a security and starts buying (or selling).

STOCK TRACKER is well documented and relatively easy to use considering the complexity of the program. The program can also be used for commodities and for training in puts and calls.

It takes approximately 40 to 50 days of trading information for the program to make a meaningful analysis. [Datapacks for individual securities containing the most recent 40 trading days' information are available from H & H – check with them on price.]

As a personal aside, I've found that utilizing STOCK TRACKER in combination with a good charting program, like Galaxy (see review) produces the best results.

MAILING LIST

1ST CLASS MAIL

Company: Continental Software Co.
Language: Applesoft
Hardware Requirements: 48K, printer helpful

Department: Business
Sugg. Retail: $99.95
Availability: 8
Disk or Tape: Disk*

1st Class Mail does everything that its name implies, and a good deal more. Perhaps the easiest way to describe the program is simply to list some of its strongest features:

(1) Custom formatting. Unlike a number of mail list programs, this program allows you to create screen formats other than straight mailing lists using as many as 9 lines. This kind of flexibility gives it minidata base capabilities, like an electronic file box. You can also customize labels both for printing labels and envelopes (including a return address feature), and there is a provision in the program that allows you to create a special message on any of the 9 lines when printing in either mode. Because of its format flexibility, *1st Class Mail* can handle most foreign addresses, and up to a 10-digit zip code.

(2) Enhanced printing capabilities. The program prints out full master lists or selected lists of your entries, as well as specially sorted lists for label or envelope printing. In addition to handling special message lines, *1st Class Mail* can handle enhanced printer commands such as a compressed print mode; if your printer has a 14" carriage, you can print as many as 9 labels across, 9 lines per label. Standard labels will only accept 6-8 lines per label, but this program makes allowances for oversized labels.

(3) Fast search and sort routines. Each diskette stores up to 750 separate entries, and the program allows you to extend your files on multiple diskettes. You enter records at random (i.e. over a long period of time and in any order you want). The program will let you search for entries, edit them, delete them, or sort them according to special needs (such as alphabetical order, company names, memos, or specific zip codes) by any of 12 different categories or combinations of categories. As a nice bonus, the sorting routine itself is extremely fast.

This program also operates with a "Form Letter" module, which provides the facility to use the program with either of the two most popular word-processing systems for the Apple, Screenwriter and Apple Writer. "Form Letter" permits you to create letters with you wordprocessor, and then custom address them using the names stored in your *1st Class Mail* files.

Documentation for *1st Class Mail* is good; but the program is well organized and completely menu-driven, so much so that you rarely need to consult the manual. For a program this flexible, it is surprisingly simple to operate.

Considering its price, *1st Class Mail* offers powerful mailing list features. Yet perhaps its greatest attribute is that it can be used for other purposes. Because the screen labels can be custom formatted, *1st Class Mail* may also function as a mini-database or cataloging system. With it you can create catalogs listing your record collection, coins or stamps, recipes, whatever; or lists for inventory or insurance purposes. All of these lists or parts of them can, of course, be printed out. This versatility makes it considerably more useful than a simple mail list program.*

*At the time we went to press, we understood that a version of this program will be available for the Apple III and the Apple III with Profile hard disk. You will need to contact the vendor as regards availability.

ADDRESS BOOK

Company: The Muse Co.
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $49.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B–	VALUE FOR MONEY	B	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	A		

Since most mailing list programs list for $19.95 to $39.95, when the ADDRESS BOOK arrived from Muse Software at a hefty $49.95 it would seem that something special was at hand.

To begin with, a mailing list program is one that should keep an orderly record of a business' or person's address list with a minimum of user time and thought.

After all, if the computer can't do it faster and more accurately, why bother?

Muse's ADDRESS BOOK does handle data quite efficiently. The user is prompted all the way through data entry with the line where the data is being requested displayed in inverse. It is quite easy to change information before the record is saved to the disk.

The problem with Muse's program is in getting there! For instance, the documentation program states that the program disk should not be used for data. Since the manual asserts that up to 700 names at 120 bytes each (plus assorted index files at two bytes each) are stored, it is no wonder that the program disk cannot be used, for the user would surely run out of space long before 700 is reached.

A nice feature of this program is the use of multiple disks and/or drives to keep the flow of labels going — although there seems to be no way of inter-linking the numerous disks for sorting purposes.

There is another feature involving indexes which may be user-defined — they are limited to two characters, however.

Printing labels seems to be a function desired by many. This program is very flexible in that respect. The user may customize label formatting to suit the job at hand. For instance, up to six labels may be printed across.

There seems to be inadequate interception of faulty information entries in the mode to define the printer format. An attempt was made to enter ludicrous information. In some cases the program rejected it, while in other instances the program simply returned to the menu.

Another feature one would like to see is the ability to print, on plain paper, a master list of all entries. This is the best way to verify the accuracy of entered data and a good way to access the information in a given file, especially if the list is printed in some sorted order.

Unfortunately, the ADDRESS BOOK has not been designed to print out a master list at all. This decision was probably made because the individual lines to be entered have no limit other than that a given record cannot exceed 120 characters. This might seem like a very inflexible approach, but it is an effective way of preventing the printing of a master list. This is because since the program has no way of knowing how long the longest line entry may be; therefore, it cannot properly format the printing of a master list across a page.

By the way, since entries are being discussed, the program does not check (until it is reached) if the maximum limit of 120 characters is close at hand. Had the program been designed to cut off line entries, this would not be a problem.

When printing labels, it seems that an adequate job has been done so that labels may be printed according to the way the user wishes. The only drawback in this area is that there has been no provision for printing a test label. This means that the user must be certain that everything has been lined up perfectly before beginning a printing session.

When in the sort program, no provision has been made to prevent the user from attempting to use this program when no entries have been made.

The documentation states that a Control-Q will exit the program and return to BASIC. During testing, this feature did not work.

MAILMERGE (MERGEPRINT)

Company: MicroPro International
Language: Z-80 machine code
Hardware Requirements: Apple II or II + with installed WordStar program, Z-80 card

Department: Business
Sugg. Retail: $150.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	A	ERROR HANDLING	A
VENDOR SUPPORT	A	VISUAL APPEAL	A		

MAILMERGE is an overlay program designed for use with the WORDSTAR text editor. It is a questionable investment if you do not have a requirement for merging small files into large documents at print time or in sorting items to be printed into a text file for printing multiple copies. If you do need these features, MAILMERGE is an indispensable package for WORDSTAR text manipulation. There are fourteen commands included in MAILMERGE for handling files. The command repertoire can be used to perform the following: specify the data file to be used for inserts; display the name and order of the data in the file; and perform repetitive reading of a specific file to the end. You are also able to specify a variable to be used in the text or ask the operator for a variable value at print time. Messages may be displayed or cleared from the video screen during printing. Files may be added within text (for example, to add chapters to a book); also, you may specify print-time line formatting to include justification, left and right margins, and line spacing.

The program works well and as advertised — a feat not normally found in the software market. If you need the capabilities for use with your WORDSTAR, buy the overlay — it's worth it.

NOTE: Version 3.00 of WORDSTAR uses an overlay called MAILMRGE.OVR. For older WORDSTAR versions, the overlay program is MERGPRIN.OVR.

APPLEPOST

Company: Apple
Language: Applesoft
Hardware Requirements: 48K — 2 Disk

Department: Business
Sugg. Retail: $50.00
Availability: 9
Disk or Tape: Disk

OVERALL RATING	C+	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	C	VALUE FOR MONEY	C+	ERROR HANDLING	A
VENDOR SUPPORT	C	VISUAL APPEAL	B+		

APPLEPOST is a mailing list program released by Apple Computer Inc.

This program has few, if any, peers on the market today in terms of its selection criteria and error handling routines. Each time a new entry is made, the files are searched and, if a duplicate entry is entered in the system, the program will advise the user, who can then check to see if the new name should be entered.

The program will sort a mailing list alphabetically, by zip code, or by any combination of five floating utility codes, making this one of the most flexible programs for handling mailing lists that must be "fine tuned" for specific markets or categories.

The one major drawback in the program is its speed. It is slow, *very* slow. Each time a name is entered, the entire data base currently on file is checked, while the user sits and ruminates . With a list of any length at all, it can take over 20 seconds to enter a single name and get ready for the next. It also stops every 22 or 23 names to merge the new entries into the file; a process that can take 10 or 15 minutes with a mailing list.

Each data disk will hold 500 names, making APPLEPOST one of the best programs in terms of file capacity. If your list has more than 500 names, additional disks may be used, but each individual disk can only be sorted within itself and cannot be merged with other disks unless additional drives are on the system. A two-drive system can handle 500 names.

To recap, the APPLEPOST program would be an excellent investment for someone who is building a mailing list a few names at a time or who needs a program that will pull out names using a large number of selection criteria. If, however, you have an existing list that you wish to put on your Apple II and you only need one or two ways to select names for mailing, this reviewer suggests you look elsewhere.

PERSONAL FINANCE

THE HOME ACCOUNTANT

Company: Continental Software
Language: Applesoft
Hardware Requirements: 48K, Disk Drive, Printer (80/132 optional)

Department: Business
Sugg. Retail: $74.95
Availability: 7
Disk or Tape: Disk

If you have ever had occasion to read articles or books pertaining to personal financial planning, I'm sure that you have noticed that there is a common theme that always appears: you cannot plan on where you are going (financially speaking) unless you know where you are now. So, if you are concerned about planning for your financial future, this program is a *must* first step.

THE HOME ACCOUNTANT is the second in a continuing series of personal financial programs by Continental Software. The first, "Home Money Minder" (see review) dealt with efficiently handling a personal checking account and a home budget. THE HOME ACCOUNTANT starts from that point and goes further. As in "Home Money Minder," THE HOME ACCOUNTANT will handle your checkbook and budget, the difference being that THE HOME ACCOUNTANT is capable of processing up to five checkbooks and 100 budget categories. Checks may be printed if desired. THE HOME ACCOUNTANT will assimilate and print a personal balance sheet showing your current net worth, as well as a monthly income statement. The Balance Sheet can be compared to a current or previous month's budget. The income statement shows the current month's financial resources; additionally, it can be used for comparison of the previous month's income.

A very powerful feature included in the system allows a complete listing of every transaction for any budget category. For example, you can obtain information on all checks written to the same person in any budget category or all checks that may be tax deductible in any category.

The program allows for approximately 1,000 transactions per disk. It also allows for the use of multiple diskettes. You may set up your program for either a calendar or fiscal year.

To borrow from the old Chinese proverb, "One picture is worth a thousand words"; THE HOME ACCOUNTANT allows not just one, but three ways of charting any account in Hi-Res graphics. Bar graphs may be used, for example, to show relationships between actual expenditures and budgeted amounts. Trendline graphs can be used to dramatically show current trends for your assets. Lastly, any three categories can be plotted at the same time.

In short, if you wish to keep tabs on your current financial position in order to effectively plan your financial future, get this program. It is probably the most flexible and versatile personal financial budgeting and planning package on the market today for the Apple computer.

THE JOHNSON FAMILY
PERSONAL BALANCE SHEET
DEC 31, 1981

ASSETS	THIS MONTH	LAST MONTH	NET CHANGE
CHECKBOOKS			
M. JOHNSON	1500	1000	500
R. JOHNSON	1000	750	250
TOTAL	2500	1750	750
CASH			
M. JOHNSON	100	200	100-
R. JOHNSON	50	100	50-
TOTAL	150	300	150-
OTHER ASSETS			
HOME	75000	75000	0
STOCK	5000	4000	1000
TOTAL	80000	79000	1000
TOTAL ASSETS	82650	81050	1600

THE JOHNSON FAMILY
PERSONAL INCOME STATEMENT
MONTH ENDED DEC 31, 1981

	THIS MONTH	PCT.	BUDGET	PCT.	NET DIF.	PCT. DIF.
INCOME						
SALARY	3000	95.2	3000	95.2	0	0
BANK INTEREST	100	3.2	100	3.2	0	0
STOCK DIVIDENDS	50	1.6	50	1.6	0	0
TOTAL	3150	100.0	3150	100.0	0	0
EXPENSES						
FOOD	400	12.7	350	11.1	50.00-	14.3-
CLOTHING	200	6.3	150	4.8	50.00-	33.3-
UTILITIES	150	4.8	200	6.3	50.00	25.0
TOTAL	750	23.8	700	22.2	50.00-	7.1-
NET INCOME	2400	76.2	2450	77.8	50.00	2.0-

```
** HOME ACCOUNTANT **
     CHECKBOOK
   STEVE  SEP 1981
     RECONCILE  SECURITY

                    $AMOUNTS
STATEMENT BALANCE     264.00

OUTSTANDING CHECKS     34.00(-)

OUTSTANDING DEPOSITS    0.00(+)
****************************************
NET BALANCE           230.00
----------------------------------------
CHECKBOOK BALANCE     230.00
****************************************

YOUR CHECKBOOK:
RECONCILES....CONGRATULATIONS
```

THE JOHNSON FAMILY
PERSONAL BALANCE SHEET
DEC 31, 1981

LIABILITIES	THIS MONTH	LAST MONTH	NET CHANGE
CREDIT CARDS			
MASTER CARD	400	200	200
VISA	200	50	150
TOTAL	600	250	350
OTHER LIABILITIES			
AUTO LOAN	7550	8600	1050-
HOME LOAN	59000	60000	1000-
TOTAL	66550	68600	2050-
TOTAL LIABILITIES	67150	68850	1700-
NET WORTH	15500	12200	3300

PERSONAL FINANCE MANAGER

Department: Business
Sugg. Retail: $75.00
Availability: 8
Disk or Tape: Disk*

Company: Apple Computer Inc.
Language: Applesoft Basic and Assembly
Hardware Requirements: Apple II Plus or Apple II with Applesoft Firmware Card or Apple II with Language System; 48K or RAM memory; and Disk II with DOS 3.3.

OVERALL RATING	B+	DOCUMENTATION	B−	RELIABILITY	A−
EASE OF USE	B+	VALUE FOR MONEY	B	ERROR HANDLING	A−
VENDOR SUPPORT	C	VISUAL APPEAL	B+		

PERSONAL FINANCE MANAGER (PFM), a family budget management program designed specifically for the Apple II, is intended to keep records of family expenditures, analyze spending patterns, simplify the maintenance of tax records and validate checkbook statements. Issued late in 1980, it is currently available in update version 5; no additional updates are contemplated by Apple Computer, Inc.

PFM provides for the storage of 2600 family financial records (check transactions, deposits, credit card charges, bank service charges, and cash expenditures) with a limit of 200 entries per month for one year and an additional 200 entries carried over from the prior year. PFM supports 24 user-defined budget categories to account for expenditures, 12 credit card accounts, and one checking account. It provides for designation and sorting of tax-deductible expenditures, reconciliation of monthly checking account statements, and comparison of actual spending habits and budgeted amounts defined by the user.

The PFM system includes features that are attractive for use with a family financial system which is not too complex. The extensive series of menus makes the program relatively easy to use, especially in conjunction with the instruction manual. Main menu selections include entering data; searching, sorting, and editing data; reconciling the checkbook; defining budget categories and summarizing same; defining credit account categories and summarizing same; providing a system status report; initializing the system and quitting. Additional selection menus exist within most categories. All menus are operated as described in the manual.

Data entry is simple and concise with requested input fields for check number (or entry category), date, 14-character notation, amount, tax status, and two-character account identification. All fields are provided for on a 40-character line. Especially convenient is the ability to enter the face amount for a single check or credit card change into several budget categories and still be able to reconcile the monthly bank statement. Data entry is facilitated by the use of default entries for consecutive check numbers (each number is incremented by one) and for same dates, as well as displaying deposit amounts in inverse video.

PFM provides for both monthly and year-to-date monitoring of expenditures in each budget category and for the comparison of expenditures to budgeted amounts. Summary data may be displayed in both tabular and bar-graph formats. The ability to input credit account debits as they occur and to be able to then immediately determine the amount owed for any of the credit accounts is useful, as is the inclusion of credit charges in budget categories along with check and cash entries.

The system provides for a status report showing the current utilization of the system. PFM also includes a simple system routine for both initializing the system and starting a new year with a carry-over of unreconciled items. The data file is easily saved to a backup diskette, by using the FID program on the DOS 3.3 System Master. PFM also provides many lucid error messages which are well-documented on the screen and further explained in the manual.

Even after considering the above features, this reviewer felt constrained and frustrated by several inadequacies of PFM while converting his family financial records to the system. Initially, being restricted to a single checking account means that PFM cannot provide a complete financial system for our records, since we use more than one checking account. While continuing the data entry procedure, the restricted binary classification format for deductible or non-deductible codes was discovered to be a severe limitation in organizing the records for tax return preparation. Multiple coding is needed to facilitate organizing Schedule A, Form 2106 and other tax-deductible expenditures, because tax categories are not always congruent with the expenditure accounts of your family budget, especially when limited to 24 categories. Advance planning and creative use of notations combined with sorting this field can help alleviate this problem.

SUPER CHECKBOOK III

Company: Powersoft
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $34.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	B+
EASE OF USE	B+	VALUE FOR MONEY	B+	ERROR HANDLING	A–
VENDOR SUPPORT	B	VISUAL APPEAL	B+		

The Powersoft people, in the face of competition, have upgraded their checkbook program a third time. In this version, they have shown consideration for their earlier customers by including a data transfer program for converting the older checkbook data files to the newer format.

SUPER CHECKBOOK III is a relatively easy to use yet comprehensive checkbook program for personal use. The new version includes a more versatile input routine for entering checks and deposits in six data field formats (actually four, since two are used for date formats). They consist of TRANSACTION, MONTH, DAY, CODE, DESCRIPTION and AMOUNT fields. Using the TRANSACTION code field, one can now enter interest payments, service charges, automatic teller transactions, etc. However, there is no feature for displaying these codes automatically, so one will have to keep the user manual handy, since they are defined in the documentation and not provided in the display. An automatic payment feature allows one to designate up to 20 recurring transactions (house payments, etc.) and enter them only once from a separate menu. It is also easier to make corrections from the menu with the new version.

Unlike most other checkbook programs, this multi-module system organizes data into one large data file rather than monthly files. Either 1350 or 1850 transactions (depending on whether the budget code type is alphabetic or numeric, respectively) can be entered in a data file. The search option is used extensively in the reconciliation mode, where one can easily spot any outstanding checks at a glance.

The plotting module displays monthly bar graphs, using text characters so that they can be outputted to any printer. One can plot income and expenses for different months or any category using the codes for any month.

There are some minor limitations to the program. It does not have a budget program that would allow one to compare actual expenditures or income against user projections. It also doesn't allow you full use of a memorandum feature capability, although the DESCRIPTION field will allow up to 32 characters. Overall, the absence of these two features does not detract from the utility of this fine package. With Powersoft's improved documentation and ease of use, this program is very useful for balancing home checking accounts, as well as handling tax deductible items. An outstanding value for the price.

A final observation on this product (and a bit of commentary on Powersoft's philosophy involving this package).

Because this system is unprotected (as most financial and business software should be), it is easily modified by a beginning Applesoft Basic programmer for implementing default options involving bank account name, printer specifications and other prompts which normally require user responses each time the system is run. Powersoft is to be commended for ignoring convoluted protection procedures that most software companies have devised for their business packages. Ostensibly, the only valid justification for protecting business software (excluding game and recreational packages) is if the vendor would provide the financial/business user with immediate and unlimited disk back-ups as needed, with the cost covered in the price of the package (the likelihood of which is about as remote as the same vendor providing software modification support for business' unique application requirements). In a word, in this reviewer's opinion, financial packages (personal and otherwise), extending through business application software, should remain unprotected for back-up and modification reasons; otherwise, the exercises in futility exemplified in attempting to devise new software protection schemes will continue to keep grade-school programmers burning the midnight oil while business awaits an answer to the down-time production and support problems in the micro-computer field.

CHEQUEMATE

Company: Masterworks Software, Inc
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $39.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C–	DOCUMENTATION	D	RELIABILITY	B+
EASE OF USE	B–	VALUE FOR MONEY	C	ERROR HANDLING	B+
VENDOR SUPPORT	B	VISUAL APPEAL	B		

Chequemate is a program designed to handle and manage personal checking accounts, charge accounts, and home budgets. The package consists of seven programs, six reports, and six files. All of the *Chequemate* programs are compatible with each other and operate in the same manner; and they are well error-trapped, so that it's virtually impossible to make an uncorrectable entry. The program has drawbacks, however: it does not print checks; the manual is very poorly written, making it an obstacle to getting started; and there is no detailed, step-by-step startup system, so if one is not careful the program disk can be inadvertently overwritten.

Once startup is mastered, the program is "friendly" in that defaults are always employed to circumvent repetitious entries and so saves time. The program allows the user to input his or her charge bills, then groups debts to the same payee into one account. If you use multiple charge accounts, having these totals consolidated can be a valuable feature. A screen print mode is activated by using CTRL-Y, and the printing controls for producing reports are easy to use. An on-screen action line — A(dd), C(hange), D(elete), R(eview), and E(xit) — is initiated by single keystroke commands, speeding the operation. If a user has a numeric keypad, the program will also accept O instead of Y for Yes responses, when asked if it is "OK" to save data to the disk.

There is a standard data entry program which allows the user to enter recurring items, such as mortgage payments, automatically each month. The bank balance is routinely updated on the Check Data Maintenance program, with quick editing available on all items. The budget data program allows the user to enter various monthly budget categories; this also has a section for actual expenditure figures, appearing next to the projected budget figures once the checks are entered.

The Statement Reconciliation section is easy to use, making it reasonably simple to balance one's checkbook. *Chequemate* also generates the following reports: Check List, Standard Entry Reports, Budget List, Budget Comparison, and Charge List. As an added feature, there is a graphics display on the screen of the budget compared to actuals by category.

In short, it is an adequate, relatively simple checkbook maintenance/home budget program, but it is by no means outstanding. It is, however, very moderately priced; but for a few extra dollars you can get similar home finance programs that offer equal ease of use and considerably more expansive overall service.

DOUBLE CHECK

Company: Bullseye Software
Language: Applesoft
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $49.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B–	RELIABILITY	B+
EASE OF USE	B	VALUE FOR MONEY	B+	ERROR HANDLING	B
VENDOR SUPPORT	B+	VISUAL APPEAL	B+		

Double Check, by Bullseye Software, is a rather fun money manager program in machine language for an Apple II/II+. Dual disk drives and a printer are very helpful, but all data can be read on the screen if a printer is not available. *Double Check* is designed to help individuals keep track of tax records, investments, and, most of all, checking accounts. The program has 100 categories which can be defined by the user. These categories can be called up at any time with an on-screen category dictionary. The program, which is copy-protected, can handle many accounts with listing, sorting, easy editing, and printing almost any kind of detail you desire.

The program is menu driven; and a hands-on tutorial is supplied on a data disk, which takes you step-by-step through the entire program. The main menu consists of six sections:

1. Start a new account
2. Update and verify checkbook
3. Update and verify bank statement
4. Catalog/Look up file names
5. Display or change balances
6. Output organizer (printer or screen)

Data is entered through selection 2, and its layout is similar to the user's checkbook, with the exception of the category codes. The program automatically saves all data to the disk whenever you choose a different option, so that at no time can much data be lost if something goes wrong. Reconciliation is relatively simple as the checks do not *have to* be sorted numerically.

As the check numbers of the cleared checks are entered, the program immediately displays all of the information pertaining to that check. If the user makes a mistake either before or after reconciliation, then the editing feature allows any changes necessary to correct it. With the use of two-digit numerical codes, the user can create a record of all transactions for the entire year. This program is not sold in stores, and is only available by direct mail from the distributor, Computer Tax Service.

EDUCATION

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EDUCATION

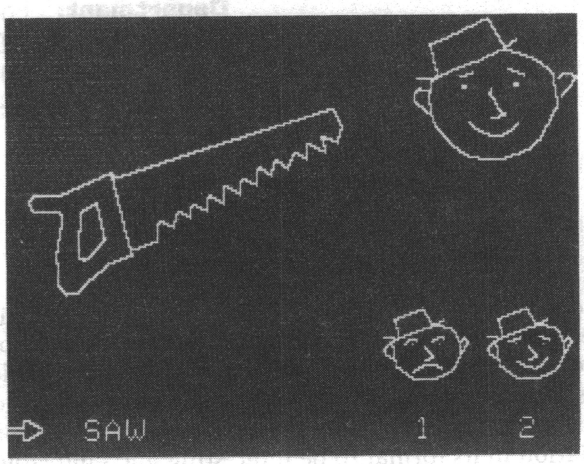
One of the most important as well as gratifying uses for the Apple computer is in the field of education. It can provide an interactive learning experience for students and easily adjust to their learning speed. It is little short of amazing to watch children from the ages of five years old and up literally sit for hours mesmerized in front of the computer. And, as long as an adult does not tell them that they are "learning", they will continue to use the computer indefinitely.

The object of a good educational piece of software obviously is to teach. It must also challenge the learner while entertaining them at the same time. Programs often have to lead the student while at the same time test and adjust the skill level in order to be successful in conveying knowledge. These are formidable tasks that cause many programs to fail. Fortunately, children are quite used to learning and absorbing information from the medium of television. Programs that take advantage of the Apple graphics and successfully avoid being condescending toward the student will most likely succeed.

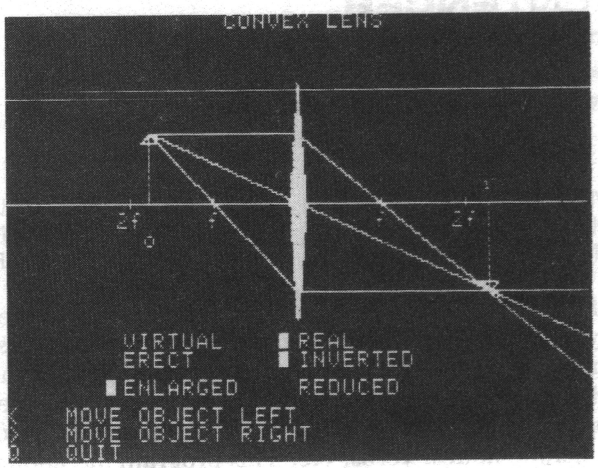
Educational programs are currently in their infancy. AP—PILOT is a an example of a language that has been specifically developed for educational programming. As new and better programming tools become available for the educator, they, not programmers, will cause a mushrooming in the volume of available software. Educational uses for the computer do not have to be solely directed towards children. The potential for adult education is just as enormous.

Currently, the available educational programs for the Apple computer as reviewed in the following section represent, we hope, just a small beginning of what will be on the market in the near future.

Programmers take note: the education market is huge and is only awaiting the results of your creative and imaginative efforts.



SPELLING BEE



OPTICS

READING & LANGUAGE SKILLS

COMPU-READ

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	A –	EASE OF USE	B +	ERROR HANDLING	A
EDUCATIONAL VALUE	B +	DOCUMENTATION	B +	RELIABILITY	A
VENDOR SUPPORT	A –	VISUAL APPEAL	A	VALUE FOR MONEY	A –

COMPU-READ consists of a series of four programs designed to aid one's reading ability. The four programs are as follows:

COMPU-READ I - A skill building series in which you respond to three letters at a time as displayed on the screen. When they disappear, you try to key in what they were. The participant controls the number of tries and the speed in which the letters are presented. Upon finishing the number of trials requested, a performance report is given upon request.

COMPU-READ II - Designed to improve skills in rapid recognition of words and phrases. The participant has control of the word list used and the number of trials. A performance report is given at the end of the program.

COMPU-READ III - This program is designed to improve skills in vocabulary by identifying synonyms and antonyms. The participant has control of the word list used, the number of trials and speed of the display. As in other programs, confirmation of correct answers is given, as well as corrections for those that are wrong.

COMPU-READ IV - Four sentences are presented at different times. The words are changed each time a new sentence appears. The participant must answer a question about each sentence after it leaves the screen. Again, the participant has control of the number of trials and speed and a performance report is presented at the end of the program.

The objectives for the aforementioned programs are: (1) increase reading speed, and (2) increase memorization of reading material. In addition, two other programs exist which enable you to build your own word list and generate these lists for the COMPU-READ program. This program can be an asset to the teacher as a skill builder and a motivational device. Both children and adults can benefit from this program by increasing their skills in reading ability. Adequate documentation is provided along with a rather flexible program.

SENTENCES

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $24.95
Availability: 3
Disk: Disk

OVERALL RATING	B +	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

SENTENCES is a program that is applicable to the second and third grade student. The child is instructed in identifying the subject, predicate and sentence fragments of a complete sentence. The programmers included a baseball game format in which the student scores a point when a correct answer is given. Review is always available if the child is having difficulty or simply wants reinforcement. Also, the child builds his own sentences towards the conclusion of the program, thereby, testing his knowledge of the subject. The authors might have expanded their program to include nouns, verbs, etc. This program has enough variation in its format to be interesting and enjoyable to the primary student.

WORD RACE

Company: Don't Ask Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $19.95
Availability: 4
Disk or Tape: Disk*

EDUCATION

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	C+	DOCUMENTATION	C+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B+

Word Race is a competitive dictionary word game for 1 to 4 players. Words are presented to each player and he must choose the correct definition among six choices. Since the value of the correct answer is linked to a counter that is constantly counting down, the quicker the correct answer, the more points awarded. Conversely, answering incorrectly subtracts the number of points on the counter. Thus there is a strategy to the game: one should either answer quickly, or, if in doubt guess only when the penalty is minimal.

The game has three levels of play. The beginner's level is for youngsters aged 9-14. Common words like "nuzzle," "swift," "daffy," and "coast" are used. The regular level is for high school students and beyond, and it is good review for students studying for the college entrance exam. Sample words include "disdain," "paeon," "pugnacious," "charisma," and "decapitate." The really challenging level uses words that are not commonly encountered. Several of these are "larrikin," "scatch," "oriel," and "mymy." As an example, the word "scride" is given with choices like "living in hedges, dance step for horses, crawl on all fours," etc. This level requires shrewd guesswork and a go for broke strategy.

The disk contains 2000 words, or about 650 words per level. There are plans to include additional word modules and a "Famous Names" game in the future. *Word Race* might be classed more as an educational program than a game, but either way it is a painless method of increasing one's vocabulary.

CLAIM TO FAME & SPORTS DERBY

Company: Don't Ask Software
Language: Machine Language
Hardware Requirements: 48K & Word Race

Department: Education
Sugg. Retail: $19.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	C+	DOCUMENTATION	C+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B+

Word Race — Claim to Fame & Sports Derby is an add on module to the *Word Race* system. You must own the original *Word Race* master disk to run this package. Each of the three modules contains 600 questions.

Claim to Fame is a trivia test about famous people. A personality must be matched against six possible choices. Many of these names are quite recognizable. They include people like Earl Warren, Xerxes, Rudyard Kipling, and Alexander Fleming. Before you rush to your encyclopedia, Fleming invented penicillin.

Sports Derby presents trivia questions concerning sports personalities. It is a great game for those fans who claim to know obscure sports' facts. Many of the personalities that you must identify have either set a sport's record; for example, one may have been a coach of a famous team.

Intermediate Word Race is a module suited to children aged 11 to 16. You must match definitions to words like "slither," "puncture," and "tinker." It is similar to games on the first disk.

AZ-ED1 WHOLE BRAIN SPELLING

Company: Sublogic Communications Corporation
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $34.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	A–	ERROR HANDLING	A–
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A–
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

This spelling improvement package employs a unique approach in teaching this currently undervalued skill: visual reinforcement as opposed to pure word memorization. Its purpose is to utilize the left side of the brain (reason) in combination with the right side (imagination) for enhancing one's spelling ability by "seeing" the words in the mind's eye. This is accomplished by clever use of graphics characters and color for displaying the words and emphasizing their structural images, using flashing upper/lower case letters and changing chromatic values.

Booting the system is no problem if you have Applesoft ROM. Alternatively, if you possess a Ram or language card minus Applesoft ROM, the usual procedure of loading Applesoft, then accessing the package disk (PR#6 if disk is in Slot #6) still prevails: the laborious two-boot route. Because this disk is protected and will not catalog, the convenience of including Applesoft (FPBASIC) and an auto-load boot isn't easily accommodated.

There are actually two functional menus in the system: the SPELLING menu, which essentially provides a tutorial on the content, and the PRACTICE selection (actually an option within the SPELLING menu), which consists of the word lists and exercises. Both make the well-written documentation almost superfluous.

The SEE HOW TO SPELL option within the SPELLING menu provides the most interesting directions on using the system. Color highlights are used to exemplify the way in which words sound alike, although spelled differently (homophones). Drawings demonstrate word associations with physical objects or pictures. A word is presented in either different colors (with the same color for identical letters), lower case, or sequential display (letter by letter) to reinforce its correct spelling. Demonstrating a word in these varied ways forcibly impresses it on the cognitive senses, according to research done by the authors of WHOLE BRAIN SPELLING.

A compendium of 200 word lists consisting of 10 words each is included for easy-to-difficult practice levels. The higher the numerical choice associated with each list, the more complex the words. Each word is output on the screen for study upon selecting a list. Hitting the RETURN key causes the word to disappear, resulting in an empty box being presented for hopefully entering the correct spelling of the previously displayed word. If the student misspells the word, a colored box will be superimposed over the incorrect letter; if a letter is omitted, a caret (^) will indicate its intended location. The word is then displayed for another attempt. If the word is correctly spelled, it is displayed in the box, each letter changing color in the manner of a neon billboard — pyrotechnic and congratulatory visual fanfare; a nice effect.

As stated in the documentation, the package is not meant as a comprehensive rote spelling course but rather as a methodology for developing word visualization abilities. It succeeds very nicely in its objective; however, it could have been designed as a more effective and flexible spelling system if customized word lists could be included and saved, as well as a score-keeping capability. This apparent shortcoming might be offset by the fact that this system could serve in another capacity: as an adjunct to a typing tutor package, in that the manner in which the words are displayed provides an excellent vehicle for practicing the touch-typing method.

SPELLING RULES

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	B+	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

This program presents the six major rules of spelling in a clever and creative format directed toward the primary grade levels.

Spelling Rules contains not only drills and a review of words but a game for the child to play that reinforces his understanding of spelling concepts. Nice graphics and sound effects.

SPELLING BEE

Company: Edu-Ware
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	EASE OF USE	B+	ERROR HANDLING	A
EDUCATIONAL VALUE	B+	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	A	VALUE FOR MONEY	A–

SPELLING BEE is designed to teach children from kindergarten to third grade-levels to spell words consisting of from one to two syllables. The technique is done through the presentation of pictures rather than the usual show-a-word method. The child is then asked to enter the correct spelling of the concrete word after its picture is briefly displayed. There are 20 lessons ranging from simple three and four letter words to varieties with double vowels or consonants, words with hard C's and silent E's, and polysyllabic words. The words are common selections that a child generally associates with objects, animals, directions and numbers.

There are two approaches taken in teaching the child; tutorial and drill. The tutorial mode presents the child with the picture, then requires him to spell it within three tries. The system doesn't allow him to type incorrect letters: however, if a child makes too many mistakes, the program will prompt the child to start over. SPELLING BEE keeps track of the score with smiling and frowning faces plus good and bad sounds for right and wrong responses, respectively. The word is finally spelled correctly if the child hits an impasse. The drill mode presents the picture and tests the child's spelling ability by having him type the correct word. If he is wrong, the correct spelling of the word is displayed for him. Appropriate faces continue keeping track of the score. Words are normally less than eight letters, but if a child fools around he can blow the scoring format by typing in more than 11 characters, resulting in the system eventually going into a hang-state if over 18 characters are entered.

The teacher has access to a learning management system secreted on the disk. When the child is asked to press the space bar after viewing the opening logo, the teacher presses the arrow key. It's fairly certain that the child will discover this procedure fairly quickly. The teacher can set up a child's lesson by entering the student's name, lesson mode, number of words per lesson and number of lessons. Thus, the teacher can set the system for the child's level of learning. When a child finishes a tutorial, the teacher can access a report of his progress. In using this system, we found that although the tutorial should be presented before the drill, in fact, if this is done, the drill mode says the child has already completed his spelling bee. Consequently, the procedure for testing the child using the words presented in the tutorial is never executed. The drill does work, however, if the tutorial isn't accessed first.

SPELLING BEE is a useful concept for teaching spelling to young children. The Hi-Res pictures are extremely well drawn. Although we feel that stand-alone talking/spelling machines are better, this is the best method we have seen implemented on the Apple to date.

SPELLING BUILDER

Company: Program Design Inc.
Language: Applesoft
Hardware Requirements: 16K

Department: Education
Sugg. Retail: $26.50
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	C+	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	C+

SPELLING BUILDER offers junior and senior high school students a series of eight spelling lessons that will help them master difficult words that stump most people. These eight lessons combined with an audio cassette voice track offer a different approach to spelling. The eight programs are described in more detail below.

1) SYLLABIFICATION—using the rules of syllabification in learning how to spell as opposed to memorization.
2) DOUBLING FINAL CONSONANT—using the rules for doubling the final consonant before adding a suffix.
3) FINAL "e" WITH SUFFIXES—rules for keeping and dropping the final "e" when adding a suffix.
4) ADDING SUFFIXES TO WORDS ENDING IN "y"—rules for keeping and dropping "y" when adding a suffix.
5) TRICKY PLURALS—drill adding "s", "es" and "ies" to words.
6)"Ie or "ei"—rules for "i" preceding "e" in a word and vice versa.
7) TROUBLESOME SUFFIXES—suffixes such as "ance" and "ence" are discussed.
8) SPELLING EXERCISE—a spelling test using the audio cassette. All the lessons are helpful in aiding children (ages 10 plus) in learning how to spell. Drills are included in each lesson and methods are taught in using those difficult words which are the exception to the rules. In addition, the author has included an audio cassette which consists of 320 words for a spelling test.

SPEED READER

Company: Apple Computer, Inc.
Language: Applesoft
Hardware Requirements: Apple II/II + with 48K and one disk drive

Department: Education
Sugg. Retail: $70.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A–	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B+	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	A–

The *Speed Reader* program follows the techniques of most of the classic speed reading courses that you might take at your local high school or college. There are exercises with letters, words, and groups of each, progressing from a rather long display time to reasonably short display times.

Once the warm up exercises are over, you can go on to the exercises with phrases. Here an entire article is shown to you a phrase at a time, and at a speed of your choice. From there the entire article is shown. Comprehension tests follow each article. The program will tell you how well you did, but you must record your results on paper to chart your progress. A program improvement would allow the user to record his/her scores into a file on disk so that the computer could keep track of progress and report it out over time.

Speed Reader uses the Hi-Res screen to display all text. The type font is easy to read and should give no problems. A square is placed on the screen at the point where text will appear, giving the user a focal point.

The program comes with three disks: the program disk, a backup, and a data disk with the text of the reading exercises. It boots on any configuration Apple, including the old II's with Integer Basic on the motherboard and a 16K expansion RAM in slot 0.

Speed Reader is advertised to "sharpen your perception, increase your eye span, and improve your eye movements." With practice, the program will help you to do all of these things. The extent to which this improves your reading speed will depend upon the work you put into your practice.

SAT English 1

Company: Micro Lab
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $30.00
Availability: 5
Disk or Tape: *

EDUCATION

OVERALL RATING	C+	EASE OF USE	A	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B–	VISUAL APPEAL	B	VALUE FOR MONEY	C

SAT English 1 is designed for high school students preparing to take the SAT college entrance exam. The programs, covering the verbal half of the test, introduce the student to the test's style and format in a non-timed situation. The program's philosophy is to have students learn by their mistakes. Thus, a student is advised why a choice is either correct or incorrect, and in turn learns the meaning of these words while gaining an understanding of why a different choice is correct. In this regard, the program is excellent.

However, what I think is lacking is depth to the program. The student tries the instruction portion once, then takes the test portion several days later, and is finished with the disk. The disk covers five brief sections of verbal comprehension: 1) Analogies (25 word pairs); 2) Antonyms (25 word pairs); 3) Completions (25 sentences); 4) Comprehension (1 story- 5 questions); and 5) English grammar (20 sentences with errors). While it might be difficult to put more material on a single disk, using any section more than once becomes repetitious.

Certainly upper middle class parents will spend any amount of money on any educational material that will help their child get into college. If a parent wants to introduce a student to the SAT test's general format with an educational package that gives positive feedback, fine, this program helps. But if they expect this small package to act as a tutorial to markedly improve the pupil's score, this program won't do it. Verbal skills are absorbed over a period of years by reading a fair number of novels and non-fiction books. It would be best to interest your children in reading long before they become seniors in high school.

GERMAN VOCABULARY DRILL

Company: Powersoft
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	C+	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	C+	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	B–

The object of this program is to provide students studying German with a means of practicing their vocabulary skills. Three types of drills are used; matching, German-to-English and English-to-German. In each of the 30 lessons, 18 word pairs are presented as a study lesson. The students can then test their memory against a matching quiz. Mistakes are flagged with an asterisk for further testing. Unfortunately, one can not exit this quiz until all matches are correct. This can be frustrating if you can't remember a word. However, in the other two quizzes, the student is given three tries for each word and is then scored on the number of correct answers.

The lessons on the disk are only meant to serve as an example. The program has an editor for creating and modifying lessons. It is simple to use as it only requires entering word pairs and a lesson name. Since the format of the program is suitable for any language, the author has included instructions to modify the program to fit any language.

The program and documentation are easy to use for both students and teachers. We did find that if the words or phrases of a lesson are too lengthy, the program will not format the screen properly for the multiple choice test. In the case of their greetings lesson, the 18th word or letter S did not show on the screen, although the test asked for letter S to be matched. It is a frustrating problem which can be avoided by pretesting lessons.

THE SPANISH HANGMAN

Company: George Earl
Language: Integer (also works on Applesoft, Machine)
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	B	VALUE FOR MONEY	B

THE SPANISH HANGMAN is a Spanish/English language hangman game with an internal vocabulary of 1600 words and 450 sentences. For each internal list, you may play the game involving translating from English to Spanish or Spanish to English, or you may guess the words given. Thus the program could be reasonably used to teach either English or Spanish.

Error handling in the program is good — it uses the GET function to eliminate endless pushing of the RETURN key and prevents the user from making any mistakes other than pushing RESET. Unfortunately, there are several problems that detract from the usefulness of the package. Once you have correctly guessed the last letter in any program, the system progresses automatically to the next problem; thus, in order to study a problem to see if the translation makes sense, you cannot put in the last letter while you examine the sentence! In addition, the problems do not seem to be graduated in any way to allow you advancement in a logical fashion to a better vocabulary. The documentation is essentialy nonexistent; some advice on how best to use the program would be very helpful.

Certainly the bottom line on a program of this type is — "Does it help you to learn Spanish?" Although I would not have expected it of a hangman game, the answer is yes! And the game is fun, either by yourself or with the family. While some improvements would be nice, this is a good program if you want help with Spanish.

MATHEMATICS

COMPU-MATH ARITHMETIC SKILLS

Company: Edu-Ware
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	A	VALUE FOR MONEY	A–

This is the lowest level program in a series of elementary math skills programs. ARITHMETIC SKILLS is intended to teach counting, addition, subtraction, multiplication, and division for young children or any of the latter four skills to remedial older students. The program allows the user to pick the area to work on and then proceeds by providing first examples followed by tests of the skills being developed.

The program graphics are somewhat slow but are superbly done. The program is intended to be used by someone with little or no reading ability. The examples make use of counting apples with a hand pointing at each one as it is counted. The hand then points at the answer in a reproduction of the top row of the Apple keyboard. This probably comes as close as to instructing the young user in how to indicate an answer as is possible in a purely visual display!

The major drawback with this program is its lack of flexibility, lack of any reward mechanism, and complete lack of scoring of any sort. While one can choose what subject to work on, one cannot choose the level at which to start. Additionally, there is no easy way to make the program progress to the next level of difficulty. Because each program is rather slow, the number of drills is rather low. Unfortunately, the effort which went into the graphics seems to be substantially superior to the effort that went into making the program really functional. While a child can probably learn some things from the program (my daughter enjoyed playing with the program). COMPU-MATH ARITHMETIC SKILLS's obvious drawbacks make it questionable whether it's really worth the high price.

COMPU-MATH DECIMALS

Company: Edu-Ware
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	A	VALUE FOR MONEY	A–

COMPU-MATH DECIMALS is the final program in the Compu-Math series and is intended to teach decimal arithmetic plus related skills – decimal to fraction conversions, rounding off, and percentages. The program has a pre-test and option menu which proceeds by providing general instructions plus examples and practice for the student, followed by a proficiency test.

The program possesses mixed qualities. Its explanation of decimals and conversion of decimals to fractions is excellent, although it ignores entirely the problem of changing common fractions (e.g. 1/4 or 3/8) to decimals. Beyond the very first part of the program, the examples are unnecessarily complex and, in several cases, wrong! The examples for decimal division use results which are infinite decimal series and which the program simply truncates after an arbitrary number with no explanation whatever.

As in all education programs, the basic question is, "Will the student learn from it?" Here the answer is yes, up to a point. Utilizing the definitions, simple addition and subtraction, the program is an excellent learning tool – though not as good as the "Fractions" program in the same series. Beyond that point, the program definitely needs work. The concept has good potential and, in a revised version, this could be an excellent program.

EDU-WARE FRACTIONS 3.0

Company: Edu-Ware
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $40.00
Availability: 9
Disk or Tape: Disk*

EDUCATION

OVERALL RATING	B+	EASE OF USE	A	ERROR HANDLING	A–
EDUCATIONAL VALUE	A–	DOCUMENTATION	A–	RELIABILITY	A–
VENDOR SUPPORT	A–	VISUAL APPEAL	B	VALUE FOR MONEY	B–

Edu-Ware Fractions 3.0 is a graphically-enhanced version of the previously released *Compu-Math Fractions*. The problem in reading fractions formed from inverse blank spaces has been overcome by the use of a very readable set of characters and figures in a shape-table. The use of color is minimal, and not vital to the working of the programs, so that it is quite possible to use black and white monitors for this package.

There is an extensive, well-prepared Learning Manager Master Menu which is designed for the teacher/parent to set up the package and present it to the student/child. It is possible to pre-program the units to be tested (definitions and parts of the fraction, denominators, addition of fractions, subtraction of fractions, multiplication of fractions, and division of fractions). Administration of a pre-test or post-test can be chosen, as can the number of questions in each unit. Sound effects can be "on" or "off" for answer entry and correction feedback. The number of incorrect responses for a practice problem before being taken back to review the material can be pre-planned. There are other very desirable controls available as well.

A previous review pointed out a very serious flaw in the earlier package. Namely, in using the common denominators formed by multiplying all of the denominators together rather than using the lowest (least) common denominator. This has not been completely corrected. If anything, there are some additional shortcomings introduced in the current version. On parts of the package, determining the reduced form of the answer is encouraged, in fact demanded — even when the answer was already in that form. The use of zero as a numerator when the result of the problem was a whole number answer is also questionable.

In addition to the inconsistent attempt at simplifying techniques, there are serious problems with the way user-responses are accepted by the program. In an attempt to control input, fields have been established on the screen. This would be a valid approach if there was a way of controlling the length of those fields as determined by the question. For example, if the field length is set for 3 digits, and the correct response was 100, then upon pressing 1, 0, and 0, the program would automatically continue; but if the correct response is 9, the user would have to press the space bar twice before the program would accept the answer and continue. To compound this difficulty, some parts of the package do not accept input without pressing (return).

The difficulty, or more precisely, the danger in allowing this package to be used by students can best be seen by an actual example:

(Note: underlining indicates my response)

1 2/4 x 1 2/6 = ?

1 2/4 = 3/2 1 2/6 = 40/30

3/2 x 40/30 = 240/120

2 ??/?? (?'s were input prompts, pressing spaces produced "Try again.") Finally the correct answer was shown:

One answer is 2 0/120

What is probably most annoying is the realization that this package could have almost been an ideal tool to use in the classroom and in the home. To this reviewer, the shortcomings could have been overcome by more care in coding. The use of random problem generation is the chief culprit in producing these bizarre results. Admittedly, the program would be longer, and repetitive, but some topics require absolute control — fractions is obviously one of those topics.

MULTIPLOY

Company: Reston Software
Language: Applesoft
Hardware Requirements: 48K, Apple II +

Department: Education
Sugg. Retail: $19.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	A –	EASE OF USE	A –	ERROR HANDLING	B +
EDUCATIONAL VALUE	A	DOCUMENTATION	B +	RELIABILITY	B +
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	A

Multiploy is yet another progressive mathematics drill program with the added incentive of an Arcade-type invader's game. In the same mold as the Lightening Software product, *Hi-Res Mastertype*, this package provides an addictive, entertaining, and educationally sound approach to what would otherwise by dull and repetitive work for a student. The game was especially designed for children between the ages of 4 and 14, but many adults could benefit with a brush-up on the simpler functions as well.

The program allows you to use the computer keyboard to answer arithmetic exercises that appear on screen in the form of "Problem Ships." You must shoot down the Problem Ship before it destroys your Answer Base. To accomplish this, type in the correct answer to any of the problems that appear on the body of the Problem Ship. If the answer is smaller than the pre-programmed answer field's length, then press RETURN. For example, if the correct answer is 5, and the field only has a length of 2 spaces, then press 5 and RETURN. Whereas, if the answer was 10, the Problem Ship would be immediately shot down upon pressing the second digit. You solve as many problems as possible in this fashion in all 3 levels of difficulty, and try to attain the top rank in each level.

There are management options which enhance the usefulness of this package. Problem Ships can drop at two different rates: normal and lightning. Games can be played with normal sound, or a low-level sound feature (useful in classroom situations). At the end of each game, all Missed Problems (Problem Ships that escaped), and their correct answers are displayed on the screen. The problems themselves are created by a random number generator, so repeated play of the game will not lead to boredom, or give an advantage to a person with an extraordinary rote memory. One objection — at the higher levels the problems become too difficult to work out mentally. . . I never learned my 17-times tables!

In summary, this is an excellent package for mathematics drill at the level it is aimed (and a little higher).

BASIC MATH [SYSTEM H]

Company: Mathware/Math City
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $59.00 per disk
Availability: 3
Disk or Tape: Disk

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	B +	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	A

BASIC MATH SYSTEM H is a set of five complete-in-themselves disks covering a 2nd through 8th grade math curriculum. Designed for the home user, each disk contains complete instructions on how to use the computer, daily record storage, and more than 35 completely different teaching modules. These modules can be used to teach concepts which are entirely new to the student, as well as to provide review and drill.

The five disks, each specializing in particular math functions, are:

Addition and Subtraction
Multiplication and Division
Fractions Concepts and Operations
Decimal Concepts and Operations
Ratios, Percentages, and Negative Integers

A subset of up to 10 modules on a disk can be chosen for a particular lesson. The beginning difficulty level of the lesson can be chosen as well, varying in five increments from easy to difficult. These initial difficulty levels are automatically adjusted as the student proceeds through the lesson, so that difficult material is presented at a relatively easy level, while material with which he has become fairly proficient is upgraded. The ever-changing nature of the problems assures students' concentration and retention.

GEOMETRY & MEASUREMENT DRILL & PRACTICE

Company: Apple
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $50.00
Availability: 5
Disk: Disk(2)

OVERALL RATING	**B**	EASE OF USE	**B**	ERROR HANDLING	**B**
EDUCATIONAL VALUE	**B**	DOCUMENTATION	**B+**	RELIABILITY	**A**
VENDOR SUPPORT	**C**	VISUAL APPEAL	**B**	VALUE FOR MONEY	**B**

Geometry & Measurement Drill & Practice is an Apple program intended to provide practice in estimating angles and metric lengths, reading clocks, naming polygons and circle parts, and computing perimeters, areas, and volumes for plane and solid figures without curved sides. The program does not provide any instructions or explanations to the user, but does give the correct answer after two misses and provides a score at the end of each section. Although there are 40 pages of documentation, it is almost exclusively a list of the various subprogram menus and provides no helpful information on the program structure. (It does estimate the time to complete various sections and provides a glossary of geometric terms.)

Many of the routines here are useful, but suffer badly in their application. For example, the clock reading routine redraws the clock for each new problem rather than simply transferring it from another area of memory. This makes the routine slow and tedious to use. Each time the user returns to the subsection menu, the program, presumably still *in memory*, is reread from the disk, causing delays. This requires the user to reenter his name, which isn't used in the system except to say "hi" at the beginning of the program. In some ways, the program fosters very bad habits by not requiring, or even using units of measure in any of the problems. (The angles are presumably in degrees, although you would never know that from the program. The linear dimensions are entirely unitless.) Because the program is protected, the user cannot easily correct the system's obvious errors, and must work with the program as is.

Several of the routines here are basically good. Estimating the lengths of lines or caterpillars in millimeters or centimeters is probably a good tool for developing a feel for metric units. Simulating clock reading is also a good exercise, although it's not clear that the computer offers any particular advantage. Basically, the implementation here is awkward to the extent that most users would feel somewhat frustrated at not being able to modify the program to fit their particular needs.

MATH/SPELLING STRATEGY (Two programs)

Company: Apple Computer Inc.
Language: Applesoft
Hardware Requirements: 48K Apple II/II +

Department: Education
Sugg. Retail: $45 each
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**B+**	EASE OF USE	**A–**	ERROR HANDLING	**A**
EDUCATIONAL VALUE	**B+**	DOCUMENTATION	**A–**	RELIABILITY	**A**
VENDOR SUPPORT	**N/B**	VISUAL APPEAL	**B**	VALUE FOR MONEY	**B**

Math/Spelling Strategy, two programs from the "Special Delivery Software" division of Apple Computer, utilize a somewhat new and rather interesting approach to learning than the methods employed in other educational programs that this reviewer has seen. Information is displayed on the screen in such a fashion that it prompts the student to "gaze" up and to the left; in theory, the necessity of actively looking for answers should make for better retention of the desired information. Then the program prompts you to visualize what you have seen and type it in. Finally, the program repeats the first step, to reinforce the lesson.

I tried the program out with some of the neighborhood children. The results were mixed, as might be expected in a small sampling of users, but nevertheless promising. The teaching method seemed to be effective, due to the fact that it forces concentration.

Both programs are geared toward young children. However, both programs can be modified and expanded, enabling parents to input their own information, enhancing their potential as learning tools. This flexibility is the greatest advantage of these programs.

MATH SEQUENCES

Company: Milliken Publishing Company
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $300.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B+	DOCUMENTATION	B	RELIABILITY	B
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

Milliken's MATH SEQUENCES, a program for both teachers and students, grades 1-6, consists of 12 diskettes providing drill practice in math in the following areas: addition, subtraction, multiplication, division, negative numbers, fractions, decimals, percent and the laws of arithmetic. Each sequence provides problems ranging from simple to complex which can be successfully implemented in a range of school environments and tailored to an individual student's needs. Math problems, presented in Lo-Res graphics, are stated in several problem formats with appropriate reinforcement and chances to try again if answered incorrectly. In addition, MATH SEQUENCES includes a review of concepts prior to introducing new ones.

The student's progress is constantly monitored by the computer and students are advanced only when specific achievement criteria have been met; or students can be moved back a level until mastery of the concept is achieved. Each diskette holds a total of 100 student records and five class records. Teachers enter students' names on each individual sequence diskette and make the appropriate assignments. When a student enters his name on the computer, it automatically takes him into the sequence and generates problems at the level assigned by the teacher. The student's work is scored immediately and upon finishing a drill session, the program updates the student's records and stores the information in the student's file. Thus, the teacher may review his progress anytime. A display of the student's progress shows where the student is in the assignment, the number of problems done, the percentage correct and, in addition, if the assignment has been started, a graph of the student's progress will appear. A print out of the student's progress can be obtained with either a parallel or serial printer. Upon completion of the student's work, his/her name may be deleted, enabling the teacher to add another student in his/her place.

This program includes excellent documentation and packaging. The teacher's guide provides a thorough explanation with regard to the use of the diskettes as well as 4 duplicating masters, and a step by step guide to operating the computer.

Schools should give serious consideration to this program for use at primary levels.

ALGEBRA I

Company: Edu-Ware
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	B	VALUE FOR MONEY	B+

ALGEBRA I is actually a misnomer as applied to this program since most schools teach this material as pre-Algebra in their eighth-grade curriculum. The furthest this program advances into algebra is linear equations.

This program succeeds very well in establishing a good mathematical foundation for Algebra. It accomplishes this through five study areas; definitions, number line operations, sets, evaluating expressions, and rules for equation reduction. It allows the student to choose the procedure for learning the material. As each course is selected from the menu, one is given a choice of learning by definition, by rule, by example, or by working sample problems. Thus, the student can skip learning methods that aren't helpful in his learning experience.

For example, if a student were learning set theory, the program would present the definitions of sets, subsets, union, and the intersection of two sets. Several examples are provided, after which the student works several sample problems. After mastering the course, the program provides a test. Tests vary each time the course is repeated so that a student won't be given the same question over again.

As with all course work, there is a final test to measure the student's understanding of all the material in this program. Overall, the program is well-implemented and useful for supplementing eighth-grade class work in pre-Algebra.

ELEMENTARY MATH

Company: The Muse Company
Language: Integer
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

ELEMENTARY MATH is a flexible tutorial program for teaching the four basic math functions; addition, subtraction, multiplication and division. The program is oriented toward the kindergarten through third grade level.

Each program module includes skill levels from one through nine. An explanation and tutorial instruction is given if the student has difficulty.

Lo-Res color graphics are nicely used and, even better (for the first time that we've seen), in an educational program, the Apple's speech capabilities are used. A portion of the program is for the teacher or parent to monitor the child's progress. Unfortunately, only one student can be accommodated at a time and there is no provision for maintaining any history of progress.

STATISTICS

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 32K w/Rom card, 48K w/o

Department: Education
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	A –	VISUAL APPEAL	B	VALUE FOR MONEY	B +

The STATISTICS program by Edu-ware performs most of the more common statistical calculations like mean, variance, standard deviation and normal distribution probability and frequency. It also does chi-square distributions and tests, as well as a T-test and a computation of the Pearson product moments correlation. It is easy to use and is primarily self-documenting. Its only major drawback is that a mistake can't be corrected once it has been entered. The program also doesn't check for invalid entries. Other than that, the program was found to be straightforward and useful.

WHAT'S THE SCORE?

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B –	EASE OF USE	B +	ERROR HANDLING	A
EDUCATIONAL VALUE	C +	DOCUMENTATION	C	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B –

WHAT'S THE SCORE? relates information regarding statistical measures. One learns facts about scores, variables and basic methods for organizing sets of scores. This program is well done. It proceeds in an organized and logical manner and would be advantageous to the beginning statistic student. One is able to work the program at his/her own pace and review a summary which is beneficial and helpful. The programs allow the participant to put in some necessary input i.e., constructing a graph. Specifically, WHAT'S THE SCORE? includes the following: (1) what scores are, (2) types of variables, (3) categorical variables, (4) score tables, and (5) picture score graphs.

SCIENCE

TELL STAR

Company: Information Unlimited Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95 & $79.95 versions
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	A	EASE OF USE	B+	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	A	VISUAL APPEAL	A	VALUE FOR MONEY	A

TELL STAR is a remarkable astronomy tool for predicting and locating objects in the stellar sky for any location and time on the earth during the late 20th century. The star and planet positions are calculated accurately for the observer's time and position. Inaccuracies, such as the earth's precession, are taken into account during a nearly five minute calculation. Accuracy is typically within 15 seconds of an arc. The program displays a Hi-Res portion of the sky 90° wide. One has a choice of any direction indicated by N, NW, W, SW etc., plus an overhead view. The constellations in any view can be drawn in with the C key. The program is capable of locating any star or planet in its star tables. The view is shown with a blinking cross hair pointing to that object. Any key displays information like its magnitude, right ascension, declination, time rises and time sets. Alternately, the user can move the cross hair to any object and retrieve the object's name and all pertinent information. If one tries to locate an object not yet risen in the sky, the computer will inform you of the fact.

There is a code for what different types of objects look like on the Hi-Res screen. Magnitude stars show up in different representations, as do planets and, of course, the moon, which is shown for the phase it currently is in. While trying to locate Jupiter, I saw what appeared to be a planet just below and to the left. Using the paddles to pinpoint the object, I was informed that it was the planet, Pluto.

The program comes in two levels. The difference is that the advanced version has two sets of star tables plus an additional table containing stars and stellar objects for the southern hemisphere. Level I tables contain approximately 180 stars and 13 Messier objects. Table II has fewer stars but nearly 90 Messier objects.

TELL STAR also contains a calculation program for converting equatorial coordinates to the horizontal and back; also ecliptic to equatorial. One can also calculate the locations of objects in the solar system without going to the display section of the program.

The documentation is well-presented in a 48 page booklet. Instructions are clear and the booklet contains tables of all objects seen in the program. This program is definitely the best astronomy program to date and very worthwhile for serious astronomers.

THE STAR GAZER'S GUIDE

Company: Synergistics
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $30.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	A–	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B–	VALUE FOR MONEY	B

THE STAR GAZER'S GUIDE is an astronomy teaching tool used to learn and identify the major constellations and stellar objects in the night sky. The system allows you to familiarize yourself with the overall winter or summer night skies and identify constellations by outlining them. A keystroke toggles the outline on and off for easy identification. Any of 40 numbered constellations can then be viewed in greater detail.

Each constellation can be outlined in either geometrical or graphical forms and general information about the constellation is displayed on the text page. The program also has some general displays and descriptions of a galaxy, globular cluster, nebulae and a double star system.

THE STAR GAZER'S GUIDE is menu-driven for easy access to all phases of the program. Its instruction book includes charts of the brightest stars and their locations and a Messier catalog locating the most common star clusters, galaxies and nebula. The program is well-suited to beginning amateur astronomers.

TRIBBLES

Company: Conduit
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $35.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**B**	EASE OF USE	**C+**	ERROR HANDLING	**B**
EDUCATIONAL VALUE	**B**	DOCUMENTATION	**B**	RELIABILITY	**B**
VENDOR SUPPORT	**B–**	VISUAL APPEAL	**C+**	VALUE FOR MONEY	**C+**

Tribbles, by Conduit, is a copyable educational program. Made for a standard 48K Apple II/II+, the disk can be muffined from 3.2.1 to 3.3, if so desired. Five duplicate student tutorial manuals come with the program. This tutorial, attempting to introduce the student to valid scientific methods of problem-solving, sharpens the student's investigative techniques by presenting the computer-simulated puzzle of an imaginary planet called Conway. The student acts as the head of a scientific team investigating life on alien planets. A space ship is sent to Conway; and while orbiting this planet, a camera probe takes a daily photograph of the planet's surface. The surface of the planet has a gridlike pattern and on it dwells a small, round, fuzzy organism that is named *Tribbleus gardnerii*, or "Tribble" for short.

The computer prints a pattern that replicates the "photographs" taken by the probe at one-day intervals. The computer then shows what happens to a set of Tribbles in a given pattern over a period of time. The student can alter the pattern and the number of days. The student, assuming that the Tribbles are like terrestrial organisms, arrives at a sound explanation for Tribble life on the planet Conway.

The manual teaches the student how to make accurate observations, how to be systematic, and how to organize his observations of the Tribble population. Guidelines, testing predictions, and step-by-step tutorials are presented in the 43 page manual. The student is taught how to summarize his or her observations using answers supplied in the manual. In my observation of this program, it is for higher level education rather than for use in primary schools. The deductive power of the student has to be sharp, and, to some degree at least, already scientifically-oriented.

DINOSAURS

Company: Cross Educational Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $15.00
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	**B–**	EASE OF USE	**B**	ERROR HANDLING	**B**
EDUCATIONAL VALUE	**B–**	DOCUMENTATION	**B**	RELIABILITY	**A**
VENDOR SUPPORT	**B**	VISUAL APPEAL	**A–**	VALUE FOR MONEY	**B–**

DINOSAURS is an educational program that teaches children to identify ten different prehistoric reptilian monsters. The dinosaurs are presented as Hi-Res animated shapes. The child matches them against a list of ten names and is graded on the number of correct answers. The child does not complete the test until he has correctly matched all dinosaurs.

"Dinosaur Hangman" was devised to reinforce the learning process by teaching the child to spell different types of dinosaur's names. The figure of a dinosaur slowly advances towards you on the screen for each incorrect letter chosen. One wins the round if the letters that constitute its name are correctly entered before the dinosaur reaches you. There is a time-limit involved in the advanced game levels.

"Firefight" is a game where the child plays the Tyrannosaurus. It must defend itself against attacking Triceratops, Brontosauruses, and flying Pteranodons. The player is armed with torches. The control keys are F, U, D, R, and L. They control the dinosaurs' body and head positions plus his weapon. Unfortunately, this game being in real time, young children will have trouble finding the keys rapidly, since they are spread out over the keyboard. The keys should have been grouped into a diamond pattern for easier movement control. Since the disk is unprotected, teachers with a minimum of programming ability should have no difficulty in changing the keys so that their students don't become frustrated with their positioning. It is also hoped that the teachers convey to their students that dinosaurs do not actually breathe fire.

Finally, there is an animated demo on the disk called "Bronto in the Swamp." Using Apple's Animatrix for animation, it is one of the cutest and finest demonstrations that we have seen to date that uses this technique. In summary, the program, although fun and cute, lacks a sense of learning depth. Although there are some descriptions of each dinosaur in the teacher's manual, they should have been included in the programs.

OPTICS

Company: Cross Educational
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $20.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	B
EDUCATIONAL VALUE	A	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	A

OPTICS is volume eight in their computer-aided instruction series for college freshmen and sophomore physics students. The programs are designed to accompany physics texts such as Resnick and Halliday's. Much of the material on this disk is also suitable for high school physics. The OPTICS disk presents three programs about ray diagrams for both lens and mirrors, two on waves and diffraction, and one concerning laser theory. Each of the programs makes use of Hi-Res graphics extensively to illustrate its lesson.

The mirror and lens ray diagram programs first discuss the definitions, followed by the rules used in constructing ray diagrams. The program draws the rays to show where the image is formed. It then shows how to find the real and virtual images for concave and convex lens, as well as for mirrors. The program is interactive in that it requires responses from the student as it presents the lesson.

The third program consists of a laboratory session. After choosing a type of mirror or lens, the student controls the position of the real object while the computer draws the ray diagrams. The student can observe the effect on the position of the image and whether it is real or virtual, erect or inverted, enlarged or reduced. It is an excellent simulation.

Observing the waves provides an explanation (first by definition, then by demonstration) of how two waves are superimposed upon each other. There is an animated demonstration of two waves going in opposite directions and how they would form a standing wave if superimposed on one another. This demo can also be single-stepped through for a closer look. The computer can also generate the sum of five complex waveforms to show how waves are Fourier-analyzed. The system demonstrates how waves of different frequency and amplitude are used to generate sawtooth and square waves. Students can try their own combinations.

The interference and diffraction program begins with definitions. Detailed and complex derivations are left to the textbook. However, the program does derive the formula for the phase difference between two waves projecting through two slits and thus forming interference patterns. The program advances to multiple slits, then to single-slit diffraction. In each case, the intensity versus phase angle is plotted. Finally, the program combines the two subjects into one resultant plot and allows the student to choose his own test case.

There is an elementary demonstration of how lasers operate. The program carefully explains how excited helium and neon atoms turn their energy into light rays, and how the light is amplified inside the laser. The program constructs a laser tube and allows you to adjust the speed of the bouncing light pulses.

The entire package provides an excellent tutorial on several selected topics in optics. The programs reside on two sides of the disk. At $20, OPTICS is a bargain for computer-aided instruction in any college physics course.

NOTE: Other programs in this series which we hope to review in our next quarterly are: "Vectors," "Statics," "Conservation Laws," "Circular Motion," "Thermodynamics," "Electricity and Magnetism," "Atomic Physics," "Solar System Astronomy," and "Stellar Astronomy." They are priced from $10 to $30.

CHEM LAB SIMULATIONS #1

Company: High Technology, Inc.
Language: Applesoft
Hardware Requirements: 32K Apple II with Applesoft card or language card or a 32K Apple II Plus with one disk drive and one pair of paddles.

Department: Education
Sugg. Retail: $100.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B+	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B+	VALUE FOR MONEY	B

CHEM LAB SIMULATIONS #1 includes three programs which use the graphics capabilities of the Apple II to simulate experiments common to the laboratory programs of many first year college chemistry courses as well as some secondary school programs. ACID-BASE TITRATION is an example of the common laboratory procedure used to determine the concentration of an unknown acid. AVOGADRO'S NUMBER and EQUILIBRIUM CONSTANT OF A WEAK ACID both use acid-base titrations, followed by a second experimental procedure. Avogadro's number is derived in the second experiment by using the titration to determine the molecular mass (weight) of a fatty acid followed by a molecular film experiment in which a monomolecular layer of the fatty acid is spread across a liquid surface. The third part of the diskette uses the titration to give the molar concentration of an unknown weak acid. This acid is identified from a selected list by determining the value of the ionization constant using the partial neutralization technique and a pH meter.

CHEM LAB SIMULATIONS #1 is the product of a microcomputer software development program for the general chemistry program at Oklahoma State University. This package is appropriately intended for most science majors in college-level general chemistry programs. Portions of it are applicable in many other introductory chemistry courses in colleges and secondary schools.

The 20 page manual which accompanies the diskette includes an introduction describing the scope of the simulations, how to use the manual and the hardware requirements as well as the starting and running instructions. The manual also provides a theoretical discussion and an experiment notes sections for each of the three simulations. The notes provide a complete explanation of the computer operations for the simulation as well as a description of what is seen on the screen in each step. No exercises or questions are included in the manual for these simulations as the same authors have done for CHEM LAB #2; inclusion of such material would improve the package.

When running each of these simulations, the viewer is first presented with a brief discussion of the experiment, both theory and technique, followed by the titration simulation. The filling of the buret and beaker are simulated graphically; the user must then read and input the level of the bottom of the meniscus on the monitor before proceeding. Reading errors greater than 0.25 ml. are not accepted and another value is requested. The user selects any one of the four modes for titration (fast, slow, drops, or dropwise); the mode may be altered during the titration. The simulation includes small details such as the turning of the stopcock and the localized color which disappears as the base is added to the acid. The titration ends with the permanent change to an orange color in the beaker; back titration is not provided for in this program. The user reads and inputs the final base level in the buret. After an acceptable value has been entered, the program performs the appropriate calculation: for the first simulation, the experimental concentration of the unknown base; for the second, the molecular weight of the fatty acid; and for the third, the concentration of the weak acid solution. From an instructional point of view, a significant improvement would be to require the user to first perform the calculation and input the appropriate answer followed by an appropriate feedback for both correct and incorrect answers.

A minimum of three titrations is required for each experimental sequence before the user is given the actual value and the experimental error calculated; feedback is given at this point about the quality of the work. Here again, a student calculation and input is preferred.

Unfortunately, the deficiencies in the programmed sequences noted above can not be corrected by the local faculty user because the diskette is protected from listing. This protection appears to increase the cost of the diskette and to decrease its instructional effectiveness.

The molecular film portion of the AVOGADRO'S NUMBER experiment may not be entered until the titration has been satisfactorily completed. The manual includes a theoretical discussion of the second part of the experiment as well as a detailed sample calculation of Avogadro's number using data from such a simulation. For this part, the student inputs drop and area data and the program calculates Avogadro's number for the various possible molecular geometries. Results from this simulated experiment will be in error by no more than a factor of 100, which is relatively accurate when compared to the size of the Avogadro number, 6.02×10^{23}½. As in the titration simulations, the user should be required to make the calculation and input the answer for evaluation.

The EQUILIBRIUM CONSTANT OF A WEAK ACID experiment simulates the use of a pH meter to determine the pH of a partially neutralized solution of the weak acid. The manual includes both a theoretical discussion and sample equilibrium constant calculations in addition to experiment notes. Here again, user calculation and input is preferred.

These simulations could be used external to the classroom for preparing the student in actual laboratory experiments. Additionally, they could profitably be reviewed after the laboratory work and used as the basis for a rapid pre-lab period presentation by the instructor. These conclusions are based on the experience of the reviewer (a credited college chemistry instructor) in running each of the three simulations using both black and white and color monitors. Further, the ACID-BASE TITRATION was run by an average student in a preparatory chemistry course in the presence of the reviewer. Two problems were observed with the graphics: 1.) the liquid area on the screen extends outside both the beaker and buret, 2.) it is impossible to read some of the black numbers on the white background in the inverted screen segments.

Use of these simulated experiments should improve student performance in the laboratory and, if the deficiencies noted herein are corrected, in the workup of data from actual laboratory experiments involving the techniques simulated in CHEM LAB #1.

CHEM LAB SIMULATIONS #2

Department: Education
Company: High Technology, Inc.
Sugg. Retail: $100.00
Language: Applesoft
Availability: 5
Hardware Requirements: 32K Apple II with Applesoft card or language card or a 32K Apple II Plus with one disk drive and one pair of paddles.
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B+	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B+	VALUE FOR MONEY	B

CHEM LAB SIMULATIONS #2 includes two programs, both involving the simulated behavior of ideal gases. Included on the diskette are simulations of common macroscopic gas law experiments as well as computer versions of the demonstration devices known as molecular dynamics simulators, which represent the behavior of these gases with molecular models. CHEM LAB SIMULATIONS #2 is the product of a microcomputer software development program for the general chemistry program at Oklahoma State University and is intended for most introductory chemistry courses in colleges and secondary schools.

The first program, IDEAL GAS LAW SIMULATION, utilizes the graphics capabilities of the Apple II to portray the behavior of an ideal gas confined in a chamber with a movable piston as one or more variables are changed. The simulation may be approached macroscopically or submicroscopically (using the molecular models). The molecular simulation consists of constantly moving, visible particles (squares rather than circles) of a gas within a container; these particles are omitted in the macroscopic case. The user is able to vary the pressure, volume, temperature and the number of gram molecules of gas by using the paddles and selected keys. In both cases, values are shown at the bottom of the screen for the pressure, volume, number of gram molecules and temperature for the gas sample under study. Unfortunately, numerical values only are shown; the units have been omitted.

The second program, ENTROPY SIMULATION, displays a compartment divided by a barrier. In one option of this program, two gases are allowed to mix; whereas, in the second option, a single gas is allowed to expand from one compartment into an evacuated chamber. In the mobile, molecular view a gas is employed, as in the first program; consequently, the user is able to follow graphically the alteration in disorder within the system which accompanies each change. For both options, the user opens the "stopcock" between the two compartments by depressing any key, allowing a running count of the number of particles in each chamber to be shown on the screen. By using selected keys and the paddles, the user is able to start, freeze, resume or restart and end the simulation as well as change the volume of one compartment and the average velocity of the particles.

A detailed manual accompanies the diskette which includes an introduction describing the scope of the simulations, how to use the manual, and the hardware requirements, as well as the starting and running instructions. The manual provides a complete explanation of the necessary operations for the several exercises included in each of the programs, as well as a description of what is seen on the screen in each step. Directions are included for exercises to illustrate concepts such as Boyle's Law, Charles' Law, the ideal gas law, kinetic molecular theory, the gas constant and entropy (order and disorder), as well as diffusion and dynamic equilibrium. These printed exercises present instructions, pose questions and problems, present discussions, and draw conclusions related to the simulations. Answers are provided in an appendix.

The package would be more useful instructionally if some of this material were displayed on the computer screen. Furthermore, additional questions for the student, especially those which require predictions that could be verified by the computer simulation are needed to improve the instructional utility of the package. Representative problems could also be included which require student answer responses. Appendices in the manual also contain defintions and equation problems, plus an index.

The reviewer, experienced in college chemistry instruction, ran each of the exercises described in the study guide on an Apple II computer with the expected and suggested results obtained. However, this was achieved for the second simulation only after it was noted that the right hand chamber was slightly larger than the left. When these were equalized by decreasing the volume on the right, the equal distribution of particles expected with equal volumes was obtained. Confusion results in attempting to use the original menu in which the instructions are obtained by selecting option 3; this would be alleviated by using option 1.

The CHEM LAB #2 simulations could be used effectively by an instructor in classroom demonstrations and prelaboratory periods to accompany discussions of the macroscopic gas laws as well as the kinetic molecular theory explanations of the behavior of ideal gases, entropy, diffusion and dynamic equlilibrium. It could also be used in out-of-class, individualized instruction or independent study situations. However, the attractiveness of this package is decreased somewhat by the protection from listing imposed by the "publisher". This prevents the faculty member from adding program elements or making other revisions to improve the correlation with the local course as well as overcoming the weaknesses noted in this review.

UNI SOLVE

Company: Edu-ware
Language: Applesoft II
Hardware Requirements: 32K Ram, Disk

Department: Education
Sugg. Retail: $24.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	C
EDUCATIONAL VALUE	B–	DOCUMENTATION	B	RELIABILITY	B
VENDOR SUPPORT	A–	VISUAL APPEAL	B–	VALUE FOR MONEY	B

The purpose of this program is to compute various electrical quantities like resistance and frequency from related quantities like current and capacitance. Among the software included are routines for the calculation of industries, Q-factors, resonant frequencies, time constants, ohm's law computations, and transistor formulae. Many of the computations are easily done on a calculator, but it is nice to have them all together at once. The one big fault of this program is its lack of error handling routines. If you type in a zero when you're not supposed to, the program bombs. On the good side, UNI-SOLVE is menu driven, so it takes you through all calculations step-by-step.

SCIENTIFIC METHOD

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $19.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B–	DOCUMENTATION	C	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B–

(Junior high school level)—One learns the explanation of certain scientific terms and how hypotheses are formulated in this program. How the laws of nature are discovered is explained and questions posed to the participant. Unfortunately, the program is limited in that only one hypothesis is discussed amd then a summary of the laws of the scientific method used is presented. The authors could have included more hypotheses and provided an opportunity for the student to formulate his own hypothesis. The authors remind us to have"fun" but the program would have been more useful with better visual appeal and more information.

ECOLOGY SIMULATIONS 1

Company: Creative Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	A	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	B–	VALUE FOR MONEY	B

These ecology simulations are based on "simulation models" developed by the Huntington Two Computer Project for the NSF. They are suitable for either a science or ecology class for grades six and up. They include background material, sample exercises and study guides. Although geared primarily for teacher use, they could be used by students with no supervision. The four programs in this package all have to do with population.

POP examines three different methods of population projection, each method adding more details than the previous one. These include exponential, logistical (carrying capacity of the system), and logistical with low density effects.

STERL allows the student to examine the effectiveness of using pesticides versus sterile males in controlling a population of screw-worm flys. One can try combinations of the two methods over a 75 day period. The simulation is quite challenging as the program considers costs and crop damages.

TAG simulates the tagging and recovery method used by ecologists in estimating the size of animal populations. Although it is a very simple program, it shows that large enough samples must be taken to insure an accurate answer.

BUFFALO allows one to investigate various herd management policies that would effect the population growth or decline of a buffalo herd.

ECOLOGY SIMULATIONS II

Company: Creative Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	A	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	B–	VALUE FOR MONEY	B

ECOLOGY SIMULATIONS II is the second volume of the series. Both programs are entirely independent of each other; depending on classroom interests, one may be preferred over the other. Again, they include background documentation and sample exercises for students. The two programs are very accurate simulations of ecology problems.

POLLUTE considers the problem of waste products on the oxygen content of a body of water (still and moving) and its impact on the fish population. The program further evaluates the effect that water temperature, amount of waste, and the type of waste treatment has on the pollution level. The results are graphed for a thirty-day period.

In RATS, one plays the role of a health inspector trying to devise an effective plan to reduce the rat population in either a city or apartment building. The choices are to eradicate them by slow or quick poisons or by controlling the refuse they feed on, or various other combinations.

MALARIA considers the problems a health official would have in controlling a malaria epidemic while taking finances into account. One specifies budgets for field hospitals, medicine, and types of pesticides. Your success or failure is graphed.

DIET explores the effects of four basic substances on your diet: proteins, lipids, proteins and calories. One enters the types and amounts of foods that are eaten at each meal, then observes whether weight is being lost or gained and whether the proper nutrition is being achieved. Since the system's menu is rather small, one has the option of entering their own foods with the values of the four parameters discussed above. The program requires a considerable amount of inputs and might be discouraging if one were trying to analyze a week-long dieting plan.

MECC SCIENCE VOL. 3

Company: Creative Computing Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $29.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	A	ERROR HANDLING	N/A
EDUCATIONAL VALUE	B–	DOCUMENTATION	B	RELIABILITY	B+
VENDOR SUPPORT	B	VISUAL APPEAL	C+	VALUE OF MONEY	C+

This MECC educational package developed for use in the the Minnesota school system contains five science programs suited for junior high school students. These programs are a rather mixed group, covering subjects in biology, astronomy, and geology. They vary widely in quality, from excellent to barely fair.

The most interesting and the best program on the disk is *Earthquakes*. The object is to teach students how to find the epicenter of an earthquake. It explains the relationship of P waves and secondary waves generated by the quake, and the lag time between these two traveling waves as recorded from three widely distanced seismographic stations. After presenting the theory, random data in graph form is generated for three stations, and the student is asked to find the epicenter using a keyboard controlled epicenter locater. The program then shows the correct location by drawing a circle showing the probable distance of the quake's epicenter as seen from each of the three stations. The intersection of the three circles is the epicenter.

Minerals is a text program that aids students in identifying twenty common minerals such as quartz, feldspar, mica, talc, and Calcite. It expects students to use paper, a steel nail, hydrochloric acid, a streak plate, glass, and a copper coin in identifying these minerals. By asking a series of questions, the program narrows the field until it picks the correct mineral. It isn't much more than a fancy method of reading a chart of mineral characteristics and doesn't add much to a student's knowledge.

Ursa is a very brief introduction to identifying five northern constellations and their relationship to the north star. This relationship and their position in the night sky can be an aid in telling time. Although the program is short and could have more depth (especially in identifying more constellations), it does give a good graphic presentation and teaches students to tell time by the stars.

Fish is a tutorial on the circulatory system of animals that have two chambered hearts, such as fish. Unfortunately, this is an old program and it uses crude, Lo-Res graphics in its drawings. The organs are shown as symbols. The program shows a molecule of blood as it passes through the heart to the lungs, then to the stomach, and follows it as it returns to the heart. The program is short and you should consider it just an extra to fill out the disk.

Odell Lake attempts to teach the relative size of six different fish that inhabit the lake waters. A student chooses a fish. As the fish encounters each of the species, it has a choice of eating the other fish, ignoring it, chasing it, or escaping into deeper or shallower water. The results of these encounters determine whether the fish survives. The student can then deduce the size relationship of the sixth fish. It is a good program and the graphics are entertaining.

VOLCANOES

Company: Earthware Computer Service
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $49.50
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	C	ERROR HANDLING	B
EDUCATIONAL VALUE	C+	DOCUMENTATION	B	RELIABILITY	B
VENDOR SUPPORT	B–	VISUAL APPEAL	C–	VALUE FOR MONEY	C

Volcanoes is an educational game designed to familiarize students with the methods of predicting volcano eruptions. It puts two or more players in the role of volcanologists. Their jobs are to investigate a group of volcanoes in the mythical land of Wrangelia. Each is assigned a different area and given a limited budget with which to carry on a scientific investigation and warn the local villagers of eminent danger. The costs and conditions closely parallel those of the real world.

There is a choice of six different investigations that the volcanologists can carry out. Some, like satellite infrared scans and electrical conductivity tests, strain their limited budgets; while seismic and tiltometer surveys, and expeditions to collect and analyze the volcano's gases, are less costly. Results are often immediate; while test results from seismic surveys take a year (that is, next turn).

THE PLANETARY GUIDE

Company: Synergistics
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	D+	EASE OF USE	B	ERROR HANDLING	A–
EDUCATIONAL VALUE	D	DOCUMENTATION	C	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	D	VALUE FOR MONEY	D+

THE PLANETARY GUIDE is intended to give an overview of the planets in the solar system. It does an adequate presentation in comparing sizes and relative orbital distances, but fails to present the individual planets and moons in an interesting fashion. Instead, planetary statistics are presented in lengthy lists.

There are other sections that include information on the orbits of comets, the phases of the moon, and the motion of the planets in the night sky. The system attempts to explain retrograde motion by plotting orbits, but the concept will need additional explanation by a teacher to help students understand the concept. The program allows the user to find the present position of the planets in the night sky. A table of correct ascensions and declinations for each planet is given to help one find the objects using a telescope.

The graphical presentation borders on the mediocre, with too much dependency on identifying the planets by symbol rather than appropriately detailed planetary drawings. The algorithms that are used to draw the planetary orbits are so slow that the presentation drags. Additionally, there are places where the graphical concepts are not clear. The developing tails of a comet appear to be pointing toward the sun rather than away during its closest approach.

This reviewer doesn't doubt that the program has its merit; nonetheless, it is overall a dull and ineffective software tool for learning this facet of astronomy. I think the subject deserves a more interesting approach.

SOLAR SYSTEM ASTRONOMY

Company: Cross Educational Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $30.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	A	ERROR HANDLING	A–
EDUCATIONAL VALUE	B+	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	B–	VISUAL APPEAL	B+	VALUE FOR MONEY	B

SOLAR SYSTEM ASTRONOMY is Volume 10 in Cross Educational's freshmen college physics series. It covers the barebone facts about the objects in our solar system. Since the package is descriptive rather than mathematical in nature, it is also suitable for high school science classes.

The program presents drawings and the latest space probe information about each of our nine planets and their moons. The facts were chosen for their interest value rather than the usual drab statistics. For instance, storm systems on Saturn have winds up to 1,110 MPH. And two moons that share the same orbit in Saturn's ring plane leap frog over each other when they pass.

Each of the planets are shown in orbit around the sun. A demonstration of these planets in motion shows that the planets closer to the sun have a faster orbital speed. The relative sizes and their differences in composition are also shown. Perhaps the orbital characteristics of an approaching comet is the most interesting simulation, since the expanding tail is clearly shown during its closest approach.

There are also lessons about the history of the solar system and the attempts to discover life elsewhere. An adequate discussion on the greenhouse effect explains why the Earth is warmer than it might be without a cloud cover, and how an increase in the carbon dioxide content in the upper atmosphere might produce a warmer Earth.

Each of the lessons is presented with Hi-Res drawings and text. The lessons are animated where appropriate. Overall, the package is nicely-implemented but appears to be suited for a beginning college science course rather than a physics class.

CIRCULAR MOTION

Company: Cross Educational Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $15.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	A–	ERROR HANDLING	A
EDUCATIONAL VALUE	B+	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	B–	VISUAL APPEAL	B+	VALUE FOR MONEY	A

CIRCULAR MOTION is Volume 5 in a series for computer-aided programs for college physics students. This volume discusses and demonstrates the velocities and forces involved when an object revolves about another, as is characteristic of a satellite when it travels an orbital path about a planet. The program evaluates objects whose speed is constant and those whose motions are variable. It defines the components of acceleration and velocity (angular and tangential), and shows their vector directions.

The concept of an object's centrifugal force in balance against its gravitational attraction is discussed and demonstrated mathematically, during which its orbital equation is derived. The relationship of an object's orbital speed with varying the distance from a planet is clearly shown in an animated sequence, in which a satellite is placed into an elliptical orbit. The student is asked various questions during the demonstration, and must demonstrate his understanding by choosing the points in the orbit where the orbiting object has its greatest and least speeds.

Dr. Cross, the creator of this package, has devised a game that is designed to further the student's understanding of orbital characteristics. An object's orbit must be changed from an elliptical to a circular path by thrusting or braking at either the perigee (closest point of orbit) or apogee (furthest point of orbit). The student is provided with a limited amount of fuel. Although the game is easy if the student understands the concept, as the objects path approaches its circular migration, it is hard to tell where the perigee and apogee lie in the orbit. Initially, the perigee is skewed to the left, but if a student makes several orbital correction mistakes, the perigee may shift to the right or it can become offset at some angle with the center. There is the possibility that the student may become hopelessly confused at this point.

The program also discusses the solution of simple harmonic motion by using the reference circle method. Several example problems are mathematically stepped through on the display.

Overall, the programs on this disk do cover the concepts very thoroughly, both visually and mathematically. They are obviously designed to be a supplement to a standard physics textbook.

STATICS

Company: Cross Educational Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $12.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	A–	ERROR HANDLING	A–
EDUCATIONAL VALUE	B–	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	B–	VISUAL APPEAL	B	VALUE FOR MONEY	B

STATICS is Volume 2 in Cross Educational Software's computer-assisted instruction for college physics students. This disk considers the forces and torques applied to beams, ladders, and objects at rest on inclined planes. Each program sets up a problem, then steps the student through the free-body diagram of the forces, resolves the forces into X and Y vectors, then sums the components in each direction to zero. It does this similarly for the torques acting upon the static object, then calculates the solution for the forces on the object. In the case of a hanging beam supported by two ropes, these unknown forces consist of the tension of the two ropes.

The programs require students to calculate their answers before proceeding, but they do step through the entire mathematical solution. Although the package is designed to supplement the college physics text, this program does nothing more than reiterate material already discussed. It does not offer any experimentation or exemplification that would give further insight into the subject of statics. In short, it is not as useful as some of the other packages in this series.

CONSERVATION LAWS

Company: Cross Educational Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $12.00
Availability: 1
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	A–	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B+	VALUE FOR MONEY	B+

CONSERVATION LAWS is the fourth volume in the physics series for college freshmen. The programs in this package discuss conservation concepts for momentum and energy. They accomplish this through definition, illustrative examples, and mathematical solutions to sample problems.

There are numerous examples of elastic and inelastic collisions. Although the system theoretically shows that momentum is conserved (in both cases) in inelastic collisions, in actuality, it is not. Examples display objects colliding and bouncing apart (elastic), as well as objects colliding and sticking together (inelastic). The equations for each example are defined, then solved by stepping through the mathematical solution. Other problems are presented to the student to solve on his own. Each of these problems requires a pocket calculator, pencil, and paper to complete.

The conservation of angular momentum is illustrated clearly by showing how an object's angular velocity slows down when the radius is increased, thus changing the object's moment of inertia. Several example problems are given to the student to solve.

A bouncing ball example illustrates that a ball's potential energy is transformed into kinetic energy as it falls, and then back into potential energy after it bounces. Other sections discuss how some energy is lost due to friction. There are also numerous mathematical problems that are carefully developed and displayed demonstrating how and when energy is conserved. A typical example shows a weight compressing a coiled spring. The student calculates how high the weight would rise if the spring were released.

This didactic package is designed to supplement a typical college physics text such as Resnick and Halliday's, or Sears and Zemansky's. Although it has several very good demonstrations, most of the programs are obviously intended for students to use in reinforcing course lectures, rather than as original material for students new to the subject.

AIRCRAFT IDENTIFICATION

Company: Rainbow Computing
Language: Applesoft
Hardware Requirements: 49K

Department: Education
Sugg. Retail: $19.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	D	DOCUMENTATION	C–	RELIABILITY	A
VENDOR SUPPORT	C+	VISUAL APPEAL	C	VALUE FOR MONEY	C–

AIRCRAFT IDENTIFICATION can either be used in learning to recognize famous aircraft covering the period from World War I up to the present or played as a game against another player, wherein the object is to Name that Plane! The disk contains 40 aircraft, with their points and line segments stored as text files. When an aircraft is chosen by number, the plane can be drawn using various scales from two different views (normal or mirror image). Since the plane is formed at random from line segments, this package can become a game in which two players compete to be the first to identify a plane while it is being drawn. Drawing speed is adjustable, in case the players want to add an element of suspense to the contest.

The planes on this disk vary from early planes, such as: a WWI Sopwith Camel; WWII planes (P-51 Mustang, B-25 Mitchell); modern fighters (F14 Tomcat, MIG-25 Foxbat) and commercial and private planes like the Boeing 727, Piper Cub and the Concorde SST. Most are easily identifiable; however, several, including the F-4 Phantom and B-58 Hustler in particular, are drawn at a somewhat poorly drawn perspective for the viewing angle. The program's storage method, consisting of text files, requires long waits in loading a particular plane, which can be maddening.

Since 40 aircraft represent a very small sampling for the $19.95 investment, the author included his drawing routines so that you can create your own. This technique basically involves tracing an outline of the plane on plastic, taping it to the screen, and playing connect-the-line-segments, using two paddles or a joystick. In summary, the package would appear to have limited appeal to the general public, with the possible exception of dedicated aviation buffs.

EVOLUT

Company: Conduit
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $35.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	B
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

Conduit's *Evolut* is an educational program made for a 48K Apple II with Applesoft and a 13/16 sector boot. The disk is copyable; and, if desired, can be Muffined from 3.2.1 up to 3.3. Five copies of student note manuals come with the program, which also includes as Teacher's Guide.

This educational program is a complete unit of introductory work on the mechanism of evolution and population genetics. An elementary knowledge of genetics, ecology, and an ability to calculate percentages and plot graphs, is the background needed to be able to make any progress with this program. The student will be able to learn about the power and importance of natural selection in producing fluctuations in gene frequencies, and eventual specialized adaptations from random genetic combinations. A hypothetical population sample is given in which factors affecting variation are defined, and from it the student should be able to predict the course of evolution.

Using this program, the student familiarizes himself with the theory of evolution and begins to understand how natural selection operates. This also involves studying adaptations found in Darwin's finches and woodpeckers, and uses computer models of pea genetics to investigate how selection alters allelic frequencies. A knowledge of alleles, dominance and recessiveness, homozygotes, and heterozygotes (including gamete formation and fertilization), is necessary in order to be able to use this program successfully. The program is based on the pea model, and the problems posed by the program should help the student gain experience in changing various parameters in the selection of the homozygotes, and so forth.

The program allows the student to use and investigate population sizes up to 500; anything greater would be unrealistic. This is a college grade subject, and would not be of any practical use to anyone not versed in at least some basic knowledge of the theory of evolution.

HEALTH & BODY

NUTRICHEC

Company: Wims Computer Consulting
Language: Applesoft
Hardware Requirements: 48K Apple II/II +

Department: Education
Sugg. Retail: $59.95
Availability: 3
Disk: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	B
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B

Nutrichec is a diet analysis program which can be used to read the nutritional and caloric values of potential diet items and so plan dietary intake. The program calculates, lists, and prints out (if you have a printer) the amount of calories, protein, fat, fiber, sodium, potassium, calcium, magnesium, phosphorous, iron, thiamin, riboflavin, niacin, ascorbic acid, and vitamin A in your diet. It also suggests the percentages of these nutrients in your diet.

The suggested intake is based primarily on the 1980 RDA and Safe and Adequate intake levels. This program can be used by any healthy person aged 3 to 80, including pregnant or nursing females. All names and quantities of the food intake are printed beside the listings of the amounts of nutrients. A bar graph is also printed which shows the percentage of suggested intake per meal.

The user must begin the program by inputting his/her weight, height, and age, followed by a "physical activity" factor, which can either be calculated from supplied tables or be estimated. The program comes complete with data bases containing over 600 current food items, including some fast foods. The data base can be increased by adding a further 300-400 items, allowing you to personalize the program to some extent.

If new items are added to the data base, a sorter is provided in the program to alphabetize all of the foods in the data base. The food lister will print the food names and quantities from the entire data base with an 80-column printer. Sample forms are provided in the manual, as well as many charts listing food sources for sound nutrition. Blank diet analysis sheets are provided in the manual so that the user can easily prepare the proper information for expedient input into the program.

The program is relatively easy to use, with adequate documentation. But a serious design flaw is that the program does not retain the input concerning personal information once the computer is shut off. The authors made no provision to write that information to the disk. Each time the program is used, you must start from scratch. This can get irritating after a while, and makes it difficult to plan long-term diets. But, despite this drawback, *Nutrichec* remains a useful tool for homes, schools, nutritionists, restaurants, clinics, and medical practices.

CIRCULATION

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C+	VALUE FOR MONEY	C+

CIRCULATION is an educational program that provides information regarding the organs of the circulatory system. The following six basic parts of the circulatory system are discussed: (1) blood, (2) heart, (3) arteries, (4) capillaries, (5) veins, and (6) lungs.

The authors explain the aforementioned circulatory elements in an organized and succinct manner.

Options are presented such as the following: you may choose to learn information in all six areas, review, or play a game against the computer that tests you on the facts regarding the circulatory system.

Although actual pictures of these parts of the body are not drawn, the program does provide adequate visual appeal. Improvement in documentation is suggested.

LIFE DYNAMIC TRANSFORMATION

Company: Avant Garde Creations
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $19.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	C+

This psychology program is applicable to those people who wish to make changes in their life and need support in doing so. Initially, multiple choice questions are asked regarding your opinion of relationships, sexual and cultural attitudes, life and death, etc. Upon finishing the questions, the program continues with specific life dynamics regarding environment, creativity, sexuality and the meaning of life. For example, the computer requires you to make a statement regarding any barriers you have regarding interaction with others in your environment. Pertinent questions are then asked to make you think about these barriers. (Not enough variation in the counseling procedure.)

The program focuses on taking responsibility for those problems. Taking action is emphasized as opposed to playing the "victim" role. You become aware of all the excuses you use in avoiding solutions to problems. Diagrams and games (with use of paddles) are available for explanations and emphasis of sub-direction.

This is a good program in regard to "consciousness-raising" and explains how pain and negative thoughts can thwart one in attaining of fulfillment and achievement of goals.

RELATIONSHIP LIFE DYNAMIC

Company: Avante Garde Creations
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $19.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C–	EASE OF USE	B–	ERROR HANDLING	C+
EDUCATIONAL VALUE	C	DOCUMENTATION	C–	RELIABILITY	C+
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	C–

The purpose of this program is to make you aware of how well you handle your relationships with others. The program begins with a clever game called "Will you get off in time?" You are riding an elevator, to the left of the elevator are relationship problems, to the right are solutions. The elevator goes up and down five floors. The floor you try to get off on will be the one containing the solution. The solutions change quickly so you must rush for the chosen one once you make up your mind.

Although informative and helpful with regard to improving your relationships with others, this program includes a game entitled "Relatopoly" which could easily have been excluded. The situations presented in this game are not necessarily realistic and the game itself is not challenging or that useful. The authors should have provided more interaction between computer and participant. Good graphics.

GEOGRAPHY & SOCIAL STUDIES

MEET THE PRESIDENTS

Company: Versa Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk

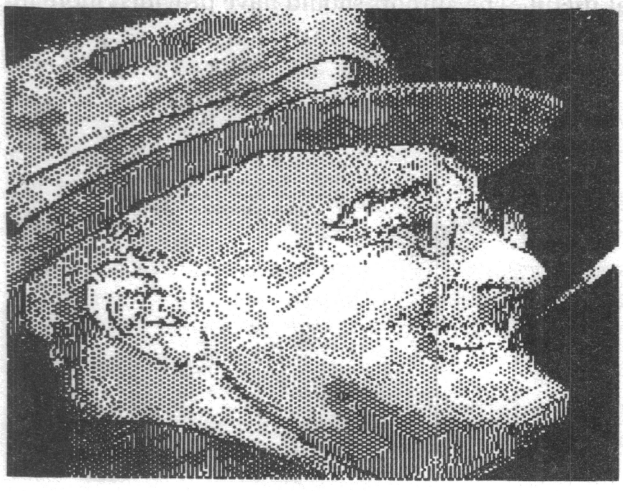
OVERALL RATING	B	EASE OF USE	B+	ERROR HANDLING	B
EDUCATIONAL VALUE	B–	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	B

Meet the Presidents is an educational package that teaches students to recognize the 40 presidents of the United States by both picture and historical facts. The 40 Hi-Res portraits were created by artist Saul Bernstein. They are some of the best art to appear on the Apple to date.

The package consists of four discs, ten presidents per disc. Thus the student is presented material in four periods of American history: 1789-1845, 1845-1881, 1881-1929, and 1929-1982. One has a choice of viewing the president's portraits, or taking the quiz. In the quiz, one must identify the president as rapidly as possible, while as many as eight different clues to his identity are given. The picture, meanwhile, becomes more distinct as time passes. The student gets the most points for a quick and correct answer.

The teacher has an option for changing the eight clues for any particular president, and setting the recognition code which comprise the letters and sequence necessary to identify the president. For example, the letters ADS are the minimum that a student must type to get the correct answer for Adams. This helps with students who have difficulty in spelling.

The one fault of the package, due to both the protection method and the lack of larger discs, is that the teacher has no method of mixing up the pictures between discs. Students are always quized on ten presidents rather than among all forty. But despite this limitation, it is certainly a good historical presentation.



MEET THE PRESIDENTS

MAP READING

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	C+	DOCUMENTATION	C	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B–

MAP READING is limited to instruction of determining distance and direction on a map. There are other skills involved in map reading that should have been included in the program and hopefully the authors will expand in this area. Visual appeal is fair—better use of the Apple's capabilities would have been beneficial. MAP READING is applicable in primary grades as an introduction to map reading skills.

SOCIAL & ECONOMIC SIMULATION

Company: Creative Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	B–	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	B	VALUE FOR MONEY	C+

SOCIAL & ECONOMIC SIMULATION is a group of three programs suitable for junior and/or senior high school social studies classes. Each program defines a model, then allows the student to run different computer test cases by changing the starting parameters. Each program also includes sample exercises and background information. This is an excellent teaching tool.

LIMITS is a model of the world which demonstrates that there are limits to sustained growth. It is a microcomputer version of an MIT project called "Limits to Growth." It assumes that population, food supply, resources, industrial output and pollution are linked together by six variables: birth and death rates, food production rate, resource usage rate, industrial growth, and pollution rates.

The results of the model are generated for a 125 year period to the year 2100 A.D. both graphically and in tables. Students can either run a standard case or modify the percentages of any of the six variables by setting them to start in any particular year. The object is to produce a stable world without causing an industrial or population collapse through unlimited growth. Although the gross aspects of the model are discussed for the teacher and students to apply, some of the more subtle aspects of the model are not. Since the model does not allow you to adjust a variable more than once for an entire run, one can not fine tune the case model over a specific time period. However, the program does demonstrate the limits of uncontrolled growth while allowing students to try their theories in controlling it. The model takes about two minutes to run each case.

USPOP explores the population growth of the United States. In a detailed simulation involving age and sex distribution plus fertility rates, one can study the projected changes in the future population. This program does allow you to stop the simulation and change your assumptions before continuing. You can assume that fertility factor will remain constant or change slowly while reaching a new level within a specific time frame. The results are shown in either graphic or tabular form.

MARKET allows two people to play the roles of competing bicycle companies in the marketplace. Each player decides the production level, advertising budget and unit price of the product. The object is to make a profit. The model is complex enough to include inventory and debt costs. It is a simple but useful model for teaching elementary business concepts.

SUPERMAP

Company: Apple
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $35.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A–	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	A	VALUE FOR MONEY	A

SUPERMAP is an educational program designed for learning about U.S. geography. It displays four possible Hi-Res maps of the U.S., showing states, vegetation, January solar radiation level, and July solar radiation level. On any of the maps, one can locate any of 300 cities and find the distance between them. For each city requested, the program displays both the location on the map and city statistics, such as population, zip code, area code, time zone, and latitude and longitude. There is also a state capital quiz.

The graphics in the program are excellent, although they are substantially better in color than in black and white. The execution of the programming is extremely good — but the material presented is very poorly chosen in some cases. For example, an elevation map would have been excellent as would mean high temperatures for January and July — but the solar radiation level? Calories per square centimeter don't do much to tell people whether it's hot or cold — even for this reviewer who happens to be a physicist! The state capitals quiz only goes through its list in alphabetical order according the the capital name and starts at a random location. Thus, it is relatively little help in reviewing, and there are no provisions for redoing ones you missed. Perhaps the most serious problem in the system is that there is no provision for updating the data or adding new towns. This prevents the user from personalizing the program and, of course, the 1970 census data is now out of date.

Allowing the user to concentrate on a particular state with, say, that state's outline and some state data would have been useful; additionally, a world map would have been excellent. In summary, SUPERMAP is extremely well executed programmatically, but is lacking in terms of flexibility and educational content.

MISCELLANEOUS EDUCATION

CAI PROGRAMS I & II

Company: Creative Computing
Language: Integer
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

EASE OF USE	A–	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	C	PRICE/USEFULNESS RATIO	B–	ERROR HANDLING	A–
		VISUAL APPEAL	B–		

The CAI PROGRAMS contain six modules suitable for children in grades 3 through 6. One module includes lessons on spelling, two geography, and three mathematics. The two geography module/programs are similar; one considers a map of Europe, the other a map of the United States. A capital flashes and one must identify the state or country either by spelling the entire name correctly or by entering its first letter. If a student misses an identification, it is presented again sometime later on (or possibly several times) until the computer is sure the student has learned that state's location or its spelling is mastered. Unfortunately, some places are difficult to spell, and a student who knows his countries is often penalized. However, from a positive standpoint, geographical spelling mastery inadvertantly becomes a side-benefit. This brings us to the system's spelling program. It displays a word slowly, then asks the child to spell that word after it is erased from the screen. This is one way to utilize spelling drills without a voice card. It requires a good short-term memory, for the word is displayed on the screen for only a few seconds.

The math programs vary in quality. Perhaps the best among the modules is ADD WITH CARRY. It offers drill and practice on sums requiring numbers to be carried. It is foolproof, requiring the student to obtain a correct answer and form the proper habits in adding large numbers. MATH DRILL allows students to practice addition, subtraction, multiplication and division. Functional numbers are no larger than 12 (i.e., 12x5), with some problems involving a time limit. METEOR MATH rewards young children by shooting down a menacing meteor if they solve a simple math problem correctly. It helps the child master the simple counting procedures used to determine the sum of two small numbers by slowly lighting up the squares in the two dice-like blocks that the child is adding together.

SHELL GAMES

Company: Apple Computer Inc.
Language: Integer
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $29.95
Availability: 9
Disk or Tape: Disk

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	A	VALUE FOR MONEY	A

SHELL GAMES, an Apple Computer Inc. product, is certainly an educational program. It is versatile, flexible and emphasizes teaching rather than just testing. At the same time, it is a "fun" program in that it makes learning an enjoyable experience.

The program utilizes three formats for testing. Its power is exemplified by the fact that the user can key into these three formats any information that he or she desires. This way, parents, for instance, can enter into the program up-to-date questions that are relative to what their child is currently studying. Quiz structures are:

(1) THE MATCH MACHINE – This program uses a matching quiz format. The categories that come with the program include: animals and their young, pseudonyms, state capitals, secret identities, presidents' birthplaces, sports and inventors.

(2) PROFESSOR TRUE – This section of SHELL GAMES has a true/false format for teaching American history. A bonus included is that after the question has been answered, the user is given some interesting data concerning the answer.

(3) MR. MULTIPLE – This is a multiple choice format quiz that also utilizes the option of giving the user facts that expand on the answer after the question has been answered correctly.

If you're looking for a program to motivate your child to learn, this is it.

FACE MAKER

Company: Spinnaker Software
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $34.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B–	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	B–	DOCUMENTATION	C+	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	C

Facemaker is an educational program designed to introduce young children (4-8 years) to the computer keyboard and the concept of programming. It does this by asking the child to construct a human face from parts: mouth, nose, eye, ear, and hair. Each of the eight choices to the left of the face range from normal to comical. The child sequences through the parts with the space bar and makes his choice with the return key. For instance, if a child dosn't like the result of adding a particular nose, he can choose another. Each of the parts in the catalog appears on the face as illustrated, except the hair, which is too fine.

Once the child has constructed a face, he can have the face smile or frown, blink, wiggle its ears, or stick out its tongue. A small program can be written using simple letter symbols that cause the face to perform the facial expressions in the order desired. Thus, the letters WT-SEF will have the face wink first, then stick out its tongue and pause for a moment, then smile, wiggle its ears, and, finally, frown. It may be a primitive approach to teaching programming, but it certainly is a creative introduction.

There is a final program suitable for developing memory skills. The face, for example, will smile. The child will press the S key to indicate that the face smiled. The face will then smile and wink, and the child presses the SW keys. Each time the face makes a longer series of facial expressions. The program rewards the child with pleasant sounds for doing well, and bad sounds for doing poorly.

Facemaker is thus an excellent program for teaching computer keyboard and memory skills to very young children. It offers a cute and clever approach. The graphics are also very well-done.

TYPING TUTOR II

Company: Microsoft
Language: Applesoft
Hardware Requirements: 48K, Drive

Department: Education
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Tape

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	A	RELIABILITY	A
VENDOR SUPPORT	A	VISUAL APPEAL	A	VALUE FOR MONEY	A+

Typing Tutor is an progressive typing program that not only teaches you to type but helps you build faster typing skills. An innovative feature is *Typing Tutor's* "Time Response Monitoring" which monitors the keyboard. This enables the computer to monitor your speed on each key individually by checking your typing 20 times per second.

The author's excellent documentation includes an explanation regarding the characteristics unique to typing on a computer, in addition to details regarding the program itself. The menu begins with the basic keys and then proceeds to numbers and symbols. The participant chooses the appropriate level and the type of lesson desired—either longer passages or a series of new letters. Progress reports and evaluations are included. Options such as "allow slower response" are offered, enabling you to adjust the response time.

While there are some differences between the Apple II keyboard and a standard typewriter, you should be able to adapt easily once you know the location of the keys.

This is a unique and useful instructional program for many purposes.

HI-RES MASTERTYPE

Company: Lightning Software
Language: Assembly & Compiled Basic
Hardware Requirements: 48K 13 or 16 sector (or Apple III in emulation mode)

Department: Education
Sugg. Retail: $40.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**A –**	EASE OF USE	**A –**	ERROR HANDLING	**A –**
EDUCATIONAL VALUE	**A –**	DOCUMENTATION	**A –**	RELIABILITY	**A –**
VENDOR SUPPORT	**A –**	VISUAL APPEAL	**B**	VALUE FOR MONEY	**C –**

Hi-Res MasterType is yet another progressive typing program, but with a difference. It incorporates an Invader type game as it presents opportunities to practice typing skills.

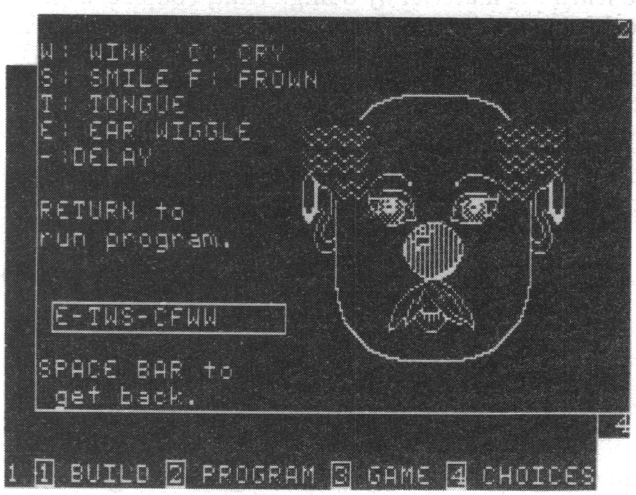
The typist is in command of the space ship at center screen. In the four corners of the screen appear letters, words, numbers, and/or other combinations that the typist must quickly enter, in order to prevent their slow, but constant movement towards the ship, resulting in a collision that will produce damage. The collisions and/or the successful typing of one of the "enemy" phrases is rewarded with sound and color displays. There is a sequence of 10 such trials before a message appears to report both on the status of the ship and the speed of the typist in words per minute.

The diskette provides 17 lessons. Lesson #1 starts with the letters ASDFGHJKL, and presents each letter in this home row as an "enemy" word. Lesson #2 presents two or three letter words of that row. Lesson #3 uses three, four, or five letter words of the same row. Lesson #4 moves to the third row, with the letters, QWERTYUIOP. Lesson #5 provides short words using the home and third rows together, and so on up to lesson #17, which gives practice with difficult numbers and symbols. There is a MAKE LESSON on the diskette which allows the user to create lessons. They can be saved on the program diskette (never a wise option), or on a pre-initialized, 13-sector diskette.

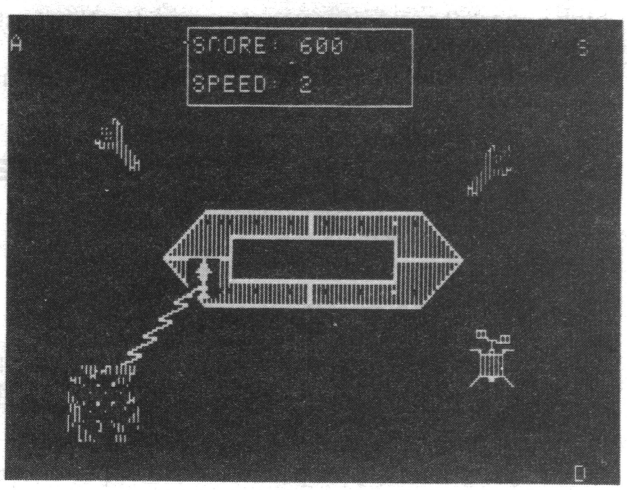
Although the instructions specify that, in any mode other than Beginner, the typist should press (SPACE) to show completion of input, it is actually more desirable to press (RETURN). Another suggestion in the manual states that to correct mistakes in typing, "press the space bar and try again. You will be penalized a few points for making a mistake, but you should have enough time to type the word again." It then states, "another way to correct your mistakes is to use the left-arrow key to backspace over your mistake and retype it." In a word-processing environment, the power of the computer is to simplify corrections. The use of the backspace to correct errors is to be encouraged, not avoided!

The advertising for this package implies that this form of play-teaching is effective, if not addictive. This reviewer has seen exactly such events take place — with a typing teacher and with students.

The price is somewhat high for this package. If that is not a major consideration, *Hi-Res MasterType* is highly recommended.



FACE MAKER



MASTERTYPE

PERSONAL FINANCIAL PLANNING

Company: Educational Programming Systems
Language: Applesoft
Hardware Requirements: Apple II or II + and disk. Serial printer for output.

Department: Education
Sugg. Retail: $100.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	B	VALUE FOR MONEY	B–

The PERSONAL FINANCIAL PLANNING program is part of a larger CompuCourse Program being published by Educational Programming Systems. Each of the programs in CompuCourse are well constructed and good buys, but they all also share some minor and a few major shortcomings the buyer ought to be aware of. These are outlined here.

General comments:

Each of the three courses reviewed comes with a set of two protected disks using DOS 3.2.1. The disk must be booted to begin. At this point one must then sit through five screens of credits and warnings before doing anything else. This is OK a few times, but rapidly gets to be tiring – especially since RESET is not captured so you must reboot if you have an older system and let your finger stray up from RETURN.

In most cases the program lets you know when long pauses will occur, but not all. In a few instances on all disks you will find a blank screen and inactive disk drive for periods of several seconds. You wonder if anything is wrong.

The text is presented a screen at a time; typed at extremely slow speeds. That's fine for the first time, but a real pain when you want to get back into the program where you left off. Several minutes can be wasted just waiting for the machine.

Personal codes are required to be entered before you are allowed access to any information previously stored on the disk. That is an excellent feature since you can use these programs for personal planning and may have your own records filed at some point.

Finally, there is an option for printing screens if desired – but it only works for serial printers. That is stated clearly in the instructions; but, to my mind, limits the program use since a large section of the buying public owns parallel interfaces. It's not that difficult to write a program that can use either and this should have been done.

Specific comments:

The PERSONAL FINANCIAL PLANNING program consists of two disks and a large binder full of information. The binder is divided into blue pages and white pages with the computer related text on the blue and the tutorial information on the white. This is a useful organization and helps find particular information fast.

The course teaches all of the important points regarding personal finance and is structured in sections: Personal balance sheet; Income/Expense accounting; Insurance management; Estate evaluation; and Income/Expense projection. Each section is taught in the classical manner with an example being presented first, an interactive session (in many cases) where you can change the example and see what happens, and then you are given the capability to use your own data to do your own planning. At any time during the example it is possible to skip to the end and start your own planning.

Nothing radical or out of the ordinary is presented by way of education. In fact, most of the information is readily available in book form at far less expense (Sylvia Porter is one author, for example). The benefit derived from buying this course over those books is that the course FORCES you to learn the material by doing. That, coupled with the high apparent cost, gives you strong motivation to stick with it. It's too easy to just skim through a book and not really learn anything.

If you are really interested in LEARNING about personal finance then this program is a good way to begin.

ADVERTISING TECHNIQUES

Company: Micro Power & Light
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $24.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	C

This program is appropriate for the upper elementary through high school level student. It includes four techniques that producers use to advertise to consumers. It shows how powerful advertising is in regard to persuading the public. Examples are presented and tests given regarding each technique. Visual appeal is somewhat limited but program content is informative.

PLANNING CASH FLOW

Company: Educational Programming Systems
Language: Applesoft
Hardware Requirements: Apple II or II + Serial printer for printed output.

Department: Education
Sugg. Retail: $100.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B+	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	B	VALUE FOR MONEY	B

PLANNING CASH FLOW is one of several CompuCourse programs published by Educational Programming Systems. (See PERSONAL FINANCIAL PLANNING for general comments about this series.)

PLANNING CASH FLOW will be of great use to the business student and to the small businessman involved in manufacturing. While the title of the course involves cash flow, what is actually studied is working capital which is of far more interest to the businessman. Specific topics covered in the computer examples are: Working capital analysis; Credit policy analysis; Inventory/order analysis; Inventory/production analysis; and Cash flow planning.

While the models are relatively simple, they should do for most small businesses with small computer needs on the order of the Apple II. Even if not used for actual record keeping and decision making, this package will give the businessman a solid background from which to grow.

All of the applications in the course appear to be well constructed, with the "example then do" structure enhancing learning. Of the three courses currently on the shelf, this one probably has the most information crammed into the two disks. Also, unlike the other two courses, you cannot readily pick up a popular book on the subject. Many books have been written on cash flow, but all are texts which really require a classroom environment for discussion and learning.

This package comes highly recommended for those who need to learn how to deal with working capital for a business.

INTRODUCTION TO COMPUTERS

Company: Society for Visual Education, Inc.
Language: BASIC
Hardware Requirements: 48K, cassette player and filmstrip projector.

Department: Education
Sugg. Retail: $205.00
Availability: 3
Disk or Tape: Disk

Educational programming is one area that as yet has not lived up to its potential. *Introduction to Computers*, one of a series of "LifeSkills" packages from SVE (a division of the Singer Company), appears to be one of the exceptions. *Introduction to Computers* is a multimedia package consisting of two diskettes, four filmstrips, two manual advance and two automatic advance cassettes (each is about 12 minutes long, and should be used in conjunction with the filmstrips), and a Teacher's Manual, which includes diagnostic guides. It is designed to be used by high schools and equivalent educational institutions. Unfortunately, the package arrived too close to the publication deadline to undergo a proper field evaluation; but, though we have not been able to rate it, we felt that it merited mention.

"The purpose of this series," to quote from the program's documentation, "is to help students become computer literate; to develop student interest in and awareness of computers; to familiarize students with computer parts, functions and programming; and to increase student understanding of the impact computers have on our society. *Introduction to Computers* presents basic computer concepts without the need for actual hands-on experiences. If such equipment is available, the teacher has the option of using the computer to enhance, reinforce, and complement the information outlined in the filmstrips." Education is serious business, of course, and this unrelievedly dry tone is maintained throughout the lessons. And the emphasis is truly on "basic": it begins at the beginning, and progresses toward programming concepts and problem-solving using computers. Many students interested in such a class may already be a bit more familiar with what computers are and do than is assumed here. But it is probably better to err on the side of simplicity where computers are concerned, and our initial perception of the program is that it accomplishes its purposes exceptionally well.

Briefly, by the time the course is over the student will have been introduced to definitions of the computer and computer languages, and current attitudes about computers. It describes the components, functions, advantages and disadvantages of a computer, the differences between hardware and software, and the elements involved in information processing; and it outlines the essential steps involved in computer programming. It also points toward possible careers in the computer industry. It would be best, of course, to offer hands-on experience with computers in learning this material; but even without this reinforcement, the program should provide a solid foundation of information from which to build.

We hope to have a review based on actual school experience with this program in the next supplemental issue of *The Book*.

APPLE MUSIC THEORY

Company: Apple Computer Co.
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $50.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	C	VISUAL APPEAL	B	VALUE FOR MONEY	B

APPLE MUSIC THEORY is a set of educational programs that provide theory, drill and practice skills involving reading and listening to music. The programs fall into four categories: Introduction, Terminology and Notation, Rhythm, and Pitch.

Terminology and Notation contains four programs that give students practice in identifying notes, key signatures and musical terms. Rhythm covers note types, counting, comparing written and performed rhythm and playing rhythmic patterns. Finally, Pitch contains lessons on interval recognition, sight and sound correlation, scales and chords.

Each of the lessons consists of a series of drills pertaining to the topic covered. The booklet contains a short course on music theory for that topic but doesn't pretend to substitute for a good textbook. The student may then choose a level of difficulty for his lesson. In most cases, the student is either presented with a graphic representation of the music or a range of musical tones that pertain to the question. For example, in a five note harmonic, one might be asked to identify the note by sound that doesn't match its written counterpart.

This program is meant to be used as a supplement to classroom instruction. It becomes very helpful to students who need extra practice since it allows students to proceed at their own level. In summary, the lessons are presented nicely, but the Apple's sound system leaves something to be desired.

NOTE: Apple was thoughtful enough to provide a backup disk for its protected software.

LINKSAMPLER I

Company: Link Systems
Language: UCSD Pascal source text
Hardware Requirements: 64K, a modem-card UCSD Pascal 1.1

Department: Education
Sugg. Retail: $59.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A–	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	A–	DOCUMENTATION	A–	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	C	VALUE FOR MONEY	C

Linksampler I contains 21 example programs designed to demonstrate Pascal to programmers with some background in another computer language. All programs are of elementary level with no disk access, Apple graphics, or dynamic data management. It emphasizes heavily documented programs solving various numeric problems.

The examples range from the second most simple Pascal program, a single executable statement, to recursive procedures used to solve mazes, and a simple lunar lander program. The examples in between are designed to introduce the concepts of Pascal one at a time so that each program assumes knowledge of the previous one, and uses these comments to explain the new procedures.

The extensive use of comments in the programs deserves particular mention, since they are the core here for a beginning programmer. In most cases the comments are longer than the program itself. They are set off from the programs nicely, so there is no confusion between program and commentary. The mathamatics of the example problems is well explained and intermediate results are clearly labeled. But there is no clever programming here. These programs are instead "simple" in the sense that each illustrates the use of elegant, minimally complex solutions to each problem. In fact, it seems possible that some of the problems were picked because of their elegant programming solutions.

The 67 page manual explains the use of the disk, and the structures and reserved words of Pascal using the provided programs as the examples. The documentation in the manual does not noticeably duplicate that on the disk. While not a complete text on Pascal, this would go well with any of the standard texts or the Apple documentation, providing an alternate explanation of the language with working examples. The booklet is well printed on heavy stock and spiral bound, which gives a very professional and readable look. The body of text, however, is set with typewriter type that spoils this effect, but the usefulness of the text remains intact.

Altogether, this is a well thought out package for those interested in learning Apple UCSD Pascal. Much care has gone into its editing and preparation. If the name *Linksampler I* is any indication, there should eventually be a volume II or III extending the concept to more complex problems.

APPLE PILOT

Company: Apple Computer, Inc.
Language: Pilot (Pascal sub-set)
Hardware Requirements: 48K, 2 disk drives

Department: Education
Sugg. Retail: $100.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	A–	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENATION	A–	RELIABILITY	A
VENDOR SUPPORT	C–	VISUAL APPEAL	A	VALUE FOR MONEY	A

APPLE PILOT is a specialized language developed for interactive teaching and learning. The Apple version of PILOT is very efficiently designed, utilizing the total capabilities of the Apple II. The package includes two diskettes and two manuals. It is necessary to have two disk drives in order to develop lessons in PILOT. The program requires only a single drive to run the lessons after creating them. The most important part of the system is the Author diskette, which allows one to create, print, or edit lessons. The development of each lesson is generated from the combined processing of four editors. The following describes the editors and their capabilities:

Lesson Editor

The lesson editor is the most important feature of the system, in that it creates text and brings together the output of the graphics and sound editors.

The lesson editor is a screen-oriented version, possessing some very sophisticated features which immediately impress the user. It allows all the standard editing capabilities, such as character insertion and deletion, plus search and replace functions that operate on a line as well as at the character level. APPLE PILOT further allows you to retrieve characters which might have been erroneously erased while using the delete mode. The editor has the capability of creating lower case on the screen, a feature that is almost a necessity in the classroom environment. The overall functions of the editor initally appear to be awkwardly implemented, on the first use. Each keystroke resulted in unexpected results. Frequent reference to the manuals was at first necessary; however, the major functions are soon assimilated after normal use. Essentially, during the course of a few hours spent in working with the lessons, the quick reference card that accompanies the program becomes the only necessary recall source.

The Lesson Editor is used to create the main body of the text, allowing the user to intersperse sound or graphics between the text wherever desired. The editor, in a general sense, is very similar to Pascal; both languages are highly-structured. Also, line numbers are not required, making editing a breeze. The program allows you to perform error-trapping by specifically designating the exact location of a bug. This feature will prove to be a significant help in the debugging process. Overall, the Lesson Editor is well-documented and, with *reading* and *practice*, can be learned fairly quickly.

Character Set Editor

The character set editor allows the user to redefine the keys on the keyboard to create alternative symbols for shape tables or animation. As a general rule, animation design can be a lengthy process; if one intends to do much animation using the system, the PILOT Animation Package is strongly recommended. The character editor allows the user to redefine any key, including lower case characters generated by the software. Several character sets come with the sample lessons; you may even recognize Maxwell, the friendly little man who also appears in the "Dos Tool Kit". Incidentally, the character set is the same in the "Tool Kit". In truth, the character editor is a nice addition to the PILOT System; however it requires some patience to master.

Graphics Editor

The graphics editor is the most exciting feature of the PILOT package. The editor is very well constructed in terms of ease of use, documentation and help-prompting. Ease of use can be credited to the "rubber band cursor", which allows one to use the keyboard as well as the game controllers for creating pictures. The features of this editor include the ability to draw lines, boxes, frames, circles, and ovals using any of the major seven colors. The help screen is easily accessed and well-designed. Also, the ability to tell where the cursor is located in relationship to each row and column allows the user to ensure that the graphics never overlay the text windows. One of the major attributes of the system is the ability to easily intersperse text and graphics and set up viewport windows for storage. This is accomplished with a very simple one line statement. Normally, this task would require a lengthy Basic statement. One also is allowed the ability to load pictures saved from this editor by a "quick load" technique, which displays the screen immediately. The user also has the option of displaying the picture in the sequence in which it was created, thus allowing you to watch it while it is being drawn. After using both the keyboard and paddle inputs, it was discovered that the keyboard was better for detail work, while the paddles were better suited for large pictures. The graphics procedures are easy enough to understand that *anyone* can learn to use them quickly.

In summary, this is an excellent software package for computer-aided instruction utilizing Apple graphics, either for the classroom or for enthusiasts who wish to learn some of the rudiments of CAI programming techniques.

LOGO

Company: M.I.T., Distributed by Terrapin, Inc., and Krell Software, Inc.
Language: LOGO
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $150.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	A	DOCUMENTATION	A	RELIABILITY	A
VENDOR SUPPORT	A	VISUAL APPEAL	A–	VALUE FOR MONEY	A

Logo is a computer language that incorporates a new philosophy of education that allows experimentation and provides immediate response without much, if any, formal instruction in the language. *Logo* has been under continual development from 1968, under the sponsorship of the National Science Foundation, largely conducted at M.I.T. in the Artificial Intelligence Laboratory and the Division for Study and Research in Education.

Logo is a "user-friendly" language that can be readily learned by even an inexperienced student, yet can provide the most sophisticated programmer with the power of a recursive, procedural, modular, interactive language. It is all of these things and more, by design.

From a child's point of view, *Logo* is a drawing board with a triangular pointer sitting in the middle of the screen, pointing upward. The adults want to name that object the "turtle" — silly grownups. If the child types FORWARD 100 and presses (RETURN), the turtle moves up the screen and leaves a line behind that is about ten times its own length. If the child now types RIGHT 90 FORWARD 100 and presses (RETURN), the turtle will turn to the right and leave another trail behind. If this process is repeated, the child will have drawn a square.

If the child is shown how to use the word REPEAT, and, starting with a "clean" screen by entering DRAW, types the following line: REPEAT 4 (FORWARD 100 RIGHT 90) and presses (RETURN), the turtle will move on the screen and draw a square.

If the child is allowed (or encouraged) to try different numbers for the lengths and angle measures and repetitions, the observer will see the true intent of such a language. A child will immediately experiment with this simple-to-use program, even if the child is a greying, 40-ish teacher of High School Academic Mathematics and Computer Programming.

As sophistication and curiosity grow, the user will investigate the possibility of writing "procedures." This is a simple task. Keeping with our example, to create a "procedure" we need only type TO SQUARE and press (RETURN), and we are placed in the Edit Mode where we can type our line: REPEAT 4 (FORWARD 100 RIGHT 90), and (following the instructions at the bottom of the screen) press Control-C. From that point on, to draw that square, we need only type SQUARE and press (RETURN).

Now we are progressing. It gets boring continually redrawing the same square. There should be a way to extend this idea and draw more squares, different sized squares, other figures besides squares, etc. This, of course, is the point of the educational philosophy that generated the *Logo* language. The language is capable of using local and global variables, and to allow the calling of a procedure from within itself. This recursive feature, and the ability to pass variables to other procedures within the same workspace, makes the language comparable to some high-level computer languages.

Logo's list of primitive commands includes many graphics commands, such as BACK, FORWARD, DRAW, CLEARSCREEN, BACKGROUND (to change background color), HEADING (to move the turtle relative to its current heading), LEFT, RIGHT, PENCOLOR (to change the color of its trace), PENUP and PENDOWN (to leave a trace or not), HIDETURTLE (not to show the turtle at all), SETHEADING (an absolute positioning), SETXY (moving the turtle to an absolute location), SETX or SETY (moving the turtle to a particular X or Y location), SPLITSCREEN or FULLSCREEN (this provides the two possible types of graphic screens), and TOWARDS (positions the turtle at a specified X-Y point on the screen). Yet *Logo* is not simply a Graphic Turtle-Geometry Language. That is the deceptive part of the ads proclaiming its arrival. *Logo* also provides many numerical commands. These include addition, subtraction, division, multiplication, ATAN (this outputs an angle between 0 and 360 degrees by finding the Arctangent of two lengths, where the sign indicates the quadrant), sine, cosine, SORT (the squareroot of positive numbers), INTEGER (which truncates any fractional part), QUOTIENT (of integers), RANDOM (repeated output), and ROUND (which performs the correct integer rounding of positive or negative numbers), among others.

Logo also has commands that involve manipulating words and lists. These can provide string operations comparable to those in many BASIC dialects, but without the usual complex syntax. For example, to output the string OUT THERE from the string HELLO OUT THERE you type: BUTFIRST [HELLO OUT THERE]. If the string in the brackets was the word HIT, the output would be HI. Other commands include: BUTLAST, the counterpart to BUTFIRST; FIRST and LAST, which output the first or last word or character of a word or list; SENTENCE and WORD, which takes a variable number of inputs (lists or words, respectively), and outputs a concatenated list or word; and LIST, which takes a variable number of input words and creates a list, to name the most common commands. *Logo* also has a full complement of conditional expressions, their predicates, and procedure execution controls. These include the IF...THEN...ELSE construct (sorely missed in Applesoft), TEST...IFTRUE...IFFALSE, ALLOF and ANYOF commands (counterparts to conjunction and disjunction), NOT (negation of a condi-

tion), greater than, less than and equal to signs, LIST?, NUMBER?, WORD? and THING?, GO (which provides branching to a labeled line within a procedure), OUTPUT (passes an input to the calling procedure), REPEAT, RUN (takes a list as input and executes it as if it were a command line), STOP, and TOPLEVEL (aborts all procedures and returns to the top level of command).

Logo has commands that can easily create and edit procedures. For example, EDIT, with the auxilary commands ALL, NAMES, and PROCEDURES, enters into the editor mode to allow the use of a powerful full-screen editor which modifies, corrects, and defines one or more names or procedures. This allows the use of 15 editing commands, most of which are also available at the Command level.

Input can originate somewhere other than the keyboard, and output can be directed somewhere other than the screen. OUTPUT, for example, can direct a procedure or command line to a device plugged into a designated slot. PADDLE allows 0 to 3 input to go out from 0 to 255, depending on the setting of the specified paddle potentiometer; and PADDLEBUTTON will return True or False if the appropriate button is pressed. REQUEST waits for an input line to be typed and terminated with a carriage return; READCHARACTER outputs the "oldest" character in the buffer, or, if empty, waits for an input character; PRINT and PRINT1 take a variable number of inputs for on-screen printing, with or without a carriage return, respectively; ASCII and CHAR take a character or integer input and output the corresponding integer or character; CURSOR takes row and column inputs and places the cursor there; CLEARTEXT clears the text screen and homes the cursor; and CLEARINPUT empties the character-input buffer.

Logo handles variables by naming them. MAKE "PI 3.14159 will give the word PI the value 3.14159. This can then be printed as the line PRINT :PI. PRINT THING "PI will print the value of PI as well, but THING has more general applications.

Logo WORKSPACE consists of all correctly defined procedures, names, and their associated values. Workspace can be stored as files on diskettes; and it is also possible to store turtle-created pictures on the diskette. There are over 16 commands for managing WORKSPACE, including CATALOG, ERASE, PRINTOUT, READ, SAVE, and GOODBYE. Logo has other commands to control the distortion that some monitors produce when displaying circles and squares. It alters vertical deflection (.ASPECT). Counterpart commands to BASIC's PEEK and POKE are also provided. User provided routines in memory can be transferred. To reclaim unused storage, "Garbage Collection" can be made by using .GCOLL. The measure of free "nodes," the available space in the current WORKSPACE, is made by .NODES. You can also unlock Apple DOS commands from within *Logo*.

Logo also offers built-in debugging tools. A procedure can be paused during execution by pressing CRTL-Z, or by using the command PAUSE within a procedure (disengaged by the CONTINUE command). TRACE and NOTRACE are provided for troubleshooting a procedure. Under TRACE, each line of a procedure is executed and then waits for any key to be pressed before executing the line.

Logo also offers an extensive list of specific error messages to aid the programmer. These range from diskette problems, such as "THE DISK IS WRITE PROTECTED" or "DISK ERROR" when a diskette isn't in the drive, to tutorials such as "END SHOULD BE USED ONLY IN THE EDITOR" or "NAME IS A LOGO PRIMITIVE" when the reserved word "name" is used as a variable name.

TERRAPIN LOGO. The Terrapin version of *Logo*, reviewed above, also offers many extra, pre-defined procedures which provide software support for another product they offer, the Terrapin Turtle, a robot. It is a small, hemispherical object, eight by eight by five inches, connected to the computer by an umbilical cable. Your Apple must have a plug-in card and black box. The Turtle Robot has blinking eyes, beeps in two tones, draws on any flat surface with a solenoid-controlled pen, and moves on two wheels which can be independently controlled. It has a sense of touch.

The Terrapin *Logo*, with its series of additional programs for controlling the Terrapin Robot, plus some other utility procedures, lists at under $150. The Terrapin Turtle Robot can be purchased as a kit for under $400, or fully assembled for under $600. The Robot Interface for the Apple costs around $200. (Atari, TRS-80, KIM, Sinclair S-100, and other versions are also available.)

This package, as well as the two other reviewed below, offers much to the educator. It is highly recommended for all age groups, providing an almost ideal way to painlessly promote computer literacy in the schools.

KRELL LOGO. Krell Software, Inc., now offers their version of M.I.T's *Logo* in two forms. It is possible to purchase the LOGO Language manual alone. Krell's "Alice in Logoland" diskette, and a utility diskette, are available separately.

The above review covers the essentials of the language itself. The LOGO Language diskette is identical in both the Terrapin and Krell versions. The choice between the two packages comes down to whether the utilities, manuals, and other factors can sway a decision. If the purchaser wants all possible utilities, tutorials, and so on, it is possible to purchase the Terrapin version first, and then simply add the "Alice in Logoland" package from Krell. However, many of the utilities are not unique to either version if they originate from M.I.T.

The "Alice in Logoland" diskette consists of 21 workspaces which are heterogeneous in quality and usefulness. There seems to be no particular rationale for the ordering of these files. Each relates to a portion of *Alice in Wonderland*, but only superficially. The first lesson, AIL1, "On a Golden Afternoon," purports to introduce the novice to the LOGO turtle; yet it is not a program for beginners. It requires some prior knowledge of the language in order to make sense of what seems like meaningless text on the screen. The second lesson, AIL2, "Down the Rabbit Hole," is actually more suitable as a first lesson, for the turtle is moved about the screen with simple commands.

The third lesson, "Latitude and Longitude," is a simulation of Alice falling all the way through the earth. This demonstration is of questionable accuracy; worse, the demonstration comes without explanation. This is followed with multiple color displays of horizontal and vertical crossing lines on a globe, ostensibly the lines of latitude and longitude. Someone should check on the meaning of lines of longitude. Their representation seems totally incorrect.

The fourth lesson, "Rule 42," is at best a demonstration of quite advanced IF . . . THEN . . . ELSE programming, illustrated with actual program listings. Little if any useful explanation is provided. Various programs are displayed, and then executed. This lesson seems totally inappropriate as a fourth lesson in the tutorial series.

Some lessons are inane at best. For example, AIL16, "The Cheshire Cat," loads two shapes from the diskette, Alice and the face of the Cheshire cat; and they exchange a few lines of dialogue, displayed at the bottom of the screen, while the faces remain mute and frozen. There is no attempt at animation. End of message.

In addition, there is a file called "Instant Alice," which allows the creation of procedures using a simplified entry list of commands. There is a similar utility on the Terrapin diskette; however, this version is more versatile (it possesses 29 commands), and is probably best used as the first exposure to LOGO for a complete novice in programming.

Krell also provides 12 unique, pre-defined procedures of varying usefulness. Further, there is a workspace called "Instant Logo Tutor" which gives a somewhat incomplete listing of the commands available in LOGO, and which can be co-resident in memory with any work in progress. Finally, Krell provides 24 additional shapes to replace the "turtle" in any program. This is a nice touch, and can be very useful in distinguishing workspaces.

Krell includes a wall-chart of commands and procedure listings. It makes an attractive piece of room decoration, but it would be decidedly more practical if it had been prepared as a small reference booklet. It is the most well-written part of the package (Krell and Terrapin combined), and I recommend that it be cut up and made into a small reference booklet. Another, much smaller, chart is also provided. It lists the "Simple Logo Commands." This is of much poorer quality, and even has two inked-in error corrections.

APPLE LOGO. The version of LOGO distributed by the Apple Computer Company, Inc., was written for them by Logo Computer Systems, Inc. It uses essentially the same processes and structure, procedures, interaction, lists manipulations, and so forth. However, there are decided differences between it and the other two packages.

I would recommend against purchasing both the M.I.T and Apple versions. They have many things in common, but they *do not* use the same command names and abbreviations (or meanings), the same editing keys, the same procedure-definition process, the same syntax, the same nondestructive cursor, and the list goes on. A conflict arises in using both versions, which should be avoided.

So how do they compare? There are several primitive commands not implemented on the *Apple Logo* that deal with diskette access, and these are greatly missed. The calling of machine language routines, the easy insertion of remarks into a defined procedure, and a graceful departure are all missing. *Apple Logo* does have more primitives already in storage when the huge file is booted (and consequently it takes longer to load). There are more controls on color backgrounds, etc. And there are "tricks" that can be played when preserving and/or hiding procedures in an active workspace.

LOGO, as a language, is a useful learning tool that should be employed by any teacher interested in stimulating the creative processes in a student. Implementing either the M.I.T. or the Apple version should serve this primary purpose, though I believe mixing the two should be avoided because of the confusion involved. The M.I.T. version, in my estimation, has a slight edge over Apple's offering; but this is a very close call.

APPLE GRADEBOOK

Company: Creative Computing Software
Language: Applesoft
Hardware Requirements: 32K

Department: Education
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	B	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	C	RELIABILITY	B
VENDOR SUPPORT	C	VISUAL APPEAL	C	VALUE FOR MONEY	B–

The *Apple Gradebook* is especially designed for a teacher's record keeping and grading tasks. The teacher can enter a maximum of 35 sets of scores for any one class. The master index includes the following: 1) new class roster, 2) set of scores, 3) changing students' scores, 4) changing existing rosters, 5) examining individual student records, 6) summary of current statistics for an entire class, and 7) catalog of disk contents.

The program's main advantage to the teacher lies in easier and more accurate record keeping. Printed copies can be obtained.

TEACHER'S AIDE I

Company: Educational Software Professionals Inc.
Language: Applesoft [DOS 3.2]
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $19.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	A–	ERROR HANDLING	B
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	B–
VENDOR SUPPORT	B–	VISUAL APPEAL	A–	VALUE FOR MONEY	A

There are very few educational aid software packages on the market today that possess as much value for the dollar as TEACHER'S AIDE I. Although its single format capability allows for only the objective (multiple choice) type, its ease and flexibility in creating test/quizzes and producing them as diplays and/or hard-copies is excellent.

Because the system's disk is unprotected (praise the provider!), the programs can be converted (MUFFINed) to DOS 3.3 after INITing a target disk with the HELLO boot program. Additionally, if you don't have Applesoft in ROM, you can create an auto-boot (turnkey) system by using FID to transfer the Integer Basic HELLO program and FPBASIC (Applesoft Basic) module from the DOS 3.3 System Master disk to the newly-INITed and MUFFINed DOS 3.3 target disk. Unfortunately, the 5-page documentation doesn't cover this procedure, although it does do a comprehensive job of describing the protocol and options in this very straightforward package. (Don't be put off by the ironically-present spelling typos in the first paragraph; the smallish booklet is very lucid and helpful.)

The system's menu-driven approach provides options for creating quizzes/tests and students' score files; adding, deleting and/or editing questions on a file; reviewing contents of a quiz/test file via the video display and/or printer (the system assumes the printer is is Slot #1 — this assignment can easily be changed by anyone fleetingly familiar with Applesoft); or create hard-copy tests for students with or without the answer keys.

There are actually two primary (main) menus in the system: the STUDENT PROGRAM, which appears automatically on booting the system, and the TEACHER PROGRAM, accessed by typing in the password, "KEY" (provided for security measures against hyper-inquisitive pupils). The STUDENT PROGRAM mode provides output only, intended for administering teacher-generated quizzes or tests; the TEACHER PROGRAM mode handles all file creation, update and maintenance functions as described in the menu options above.

An American History demonstration quiz is provided with the package; if you can score on eight out of the ten questions included, you should consider yourself a nascent historian.

TEACHER'S AIDE I can be enjoyed and gainfully used by anyone interested in the educational process. A glance at the PRICE/USEFULNESS RATIO rating in this review might be useful to the potential investor; you can pay a lot more than $19.95 for a similar package (if you can find it at that price) and end up with a lot less.

ANTFARM

Company: Wims Computer Consulting
Language: Applesoft
Hardware Requirements: 48K ROM Printer optional

Department: Education
Sugg. Retail: $49.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C+	EASE OF USE	B–	ERROR HANDLING	C
EDUCATIONAL VALUE	B	DOCUMENTATION	D–	RELIABILITY	B+
VENDOR SUPPORT	C	VISUAL APPEAL	B–	VALUE FOR MONEY	B–

ANTFARM consists of a language for learning programming concepts as well as a tool for teaching fundamental programming design and structures to children and, in my opinion, to adults. The package is written in run-time Pascal and will execute on any Apple II with ROM. I found this program to be a very delightful experience while spend ing quite a few fascinating hours playing with it. The documentation takes quite a bit of studying, as there is no step-by-step instruction procedure included to aid in understanding the system.

A basic knowledge of computer operation is assumed in order to process this program. It would not run with my 80-column Smarterm, so I had to disconnect the terminal in order to see the screen. ANTFARM promotes structured programming and top-down design in small units. The program draws an antfarm on the screen with an "ant" in it. The user must tell the ant what to do to plant a garden and when to eat to stay alive. The ant is also ordered to plant more food so he can continue to survive. There is a Help command that displays the built-in commands. Any number from 1 to 9 ants can be kept alive on the field at one time. Figuring out the multiple commands and ordering the ants to perform these commands present a very interesting approach in learning good programming style.

New commands can be taught to the ant and saved to the disk or output on the printer if one is available. If an ant is lost through a command error, a replacement can be called up at once by invoking the new command. Many enjoyable hours can be spent playing with ANTFARM while acquiring programming knowledge at the same time.

SCORE, THE ACADEMIC ASSISTANT

Department: Education
Company: Scientific Software Associates
Sugg. Retail: $395.00
Language: Assembly & Compiled Basic
Availability: 4
Hardware Requirements: Apple][+ or Apple][with firmware Applesoft and 48K, 16 Sector, 80-column printer. [Options: Supports an Optical Mark Reader. Optimal utilization with 2 disk drives]
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A –
EDUCATIONAL VALUE	B +	DOCUMENTATION	B –	RELIABILITY	B
VENDOR SUPPORT	B –	VISUAL APPEAL	C	VALUE FOR MONEY	C

Score is a set of 10 programs on which to keep records of test scores, and provide statistical information on both student and test-item performance. Its maximum capacity is 200 students per class, 20 test scores per student, 100 items per exam, and 5 options per question.

Score consists of three diskettes and a 37 page, loose-leaf manual. The program's diskette is copy-protected, but a backup diskette is provided. The third diskette is for data, but any initialized, 16-sector diskette can be used. It is capable of accepting data from the following Optical Mark Readers: Chatsworth OMR500, HEI 121-4, or SCANTRON. The reader must have its appropriate interface card, and the manual provides specific instructions for interfacing each unit. Having an Optical Mark Reader, although desirable, is an option, but *Score* will function without such an accessory. In addition, it requires a printer be "on-line" at all times. You cannot access or enter data without an active printer. This can be a limitation for some users.

Score, when first booted, will enter a configuration mode requesting information about the printer, number of drives, and availability of an Optical Mark Reader. Two other questions, infrequently found in configuration programs, involve an access code and a termination code for the printer. The access code can pass a control letter to the printer which, in turn, activates a special feature of the printer (example: pressing control-0 will cause the Epson MX-100 to print in a compressed mode). The termination code can pass an appropriate Control Letter when exiting from *Score* (example: for the MX-100, a Control-R will restore normal printing). Unfortunately, the manual's suggested use of the access code, namely, Control-I followed by 80N, to specify a line length of 80 characters, did not function on my printer. Instead, 80N preceded each line of printed output!

Score, once configured, will boot into a File Identification mode, which, when responded to, will present a Menu of 7 items. The 7 options are : CHANGE, NAMES, FEEDBACK, EDIT, LATE, CORRELATION, and EXIT. Each of these options includes a short, descriptive explanation. CHANGE permits processing of another class file. NAMES allows the entering of student names for a new class. EXAM is used to enter exam responses for scoring, to produce an item analysis, and to print student reports. FEEDBACK generates reports of performance for each student from previously stored scores. EDIT accesses disk file data for changes or corrections. LATE permits the entering of responses from a student who has made up, or retaken a test. CORRELATION returns statistical analysis reports from student scores. EXIT prompts the creation of a backup file (on a different data diskette) before leaving the program.

The above descriptions do little justice to the thoroughness of the report-generating capabilities of *Score*, and the well placed reminders to backup files before they are lost from memory. However, there is a serious defect in adding a name. If you wish to place a student's name at the top of the roster, there is no easy way of doing this, since the prompt for entering a new student to the list is: NAME OF STUDENT JUST BEFORE DESIRED ENTRY LOCATION?

The LATE function allows updating a stored file due to a make-up or re-test of an individual student. A grading menu is produced as in the EXAM mode, but with only those accessible menu items that are valid for a single data entry. This presents another problem: if scores for late entries are to be expressed as "T" scores, the teacher must provide the mean and standard deviation for that test as was printed on the original report for that class.

Item Analysis is possibly the most unique part of this package and deserves a more thorough description. Each test question is evaluated for its contribution to the total test as expressed in a Difficulty Index, an Item-Total Correlation, and a Discrimination Index. A chart is printed showing the student's position in class, and frequency of choice response, plus flagged comment lines to indicate the more significant findings of this process so that questions, and/or choices can be modified accordingly. Examples: a question answered correctly by more than 90% of the class or another question answered incorrectly by only 10% of the class should be discarded or modified; also, when "good" students (the top ⅓ of the class) miss a particular question more often than the less skilled students, that question should also be discarded or modified.

The use of Item Analysis techniques, Linear Regression Equations, Correlation coefficients, Scatterplots, and other advanced statistical tools, at first blush seems highly desirable. However, there is a very important limitation to the use of such tools, which is not mentioned in the *Score* manual. It is inappropriate, if not misleading, to use such techniques when the number of questions in a test, and/or the number of students in a class are too small. There are other techniques, appropriately named "small-sample" statistics, that are designed for this situation. The question of, "How many is enough?" is not an easy one to answer. The experiences of this reviewer point to a minimum of 50 questions per test and 50 students per class before using any advanced statistical, data-reduction techniques. This is, admittedly, a conservative view.

The *Score* package, in summary, is formidable. It is powerful, accurate, and well-protected from error. It can be a very profitable tool for a teacher who makes use of multiple-choice testing. The advanced statistical features are optional; but, within the limitations mentioned above, should be useful in creating better, more reliable testing instruments.

YEARBOOK PRODUCTION SKILLS

Company: Jim Van Dyke
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $25.00
Availability: 5
Disk or Tape: Disk

OVERALL RATING	**C+**	EASE OF USE	**C**	ERROR HANDLING	**C–**
EDUCATIONAL VALUE	**B–**	DOCUMENTATION	**C–**	RELIABILITY	**B–**
VENDOR SUPPORT	**B–**	VISUAL APPEAL	**A–**	VALUE FOR MONEY	**B**

When this reviewer received a copy of YEARBOOK PRODUCTION SKILLS, I was immediately skeptical about the feasibility of teaching yearbook layout and copy-fitting using a computer. After using this program, some of my misgivings proved to be justified; I must admit, however, that I was generally impressed by the completeness of this program.

After reviewing the documentation, I proceeded to run the program to see if the author, Jim Van Dyke, a 17-year veteran of yearbook production, knows his stuff. He does!

The first module, Introduction to Layout Design, is an overview of the design process which steps the user through various yearbook layouts while pointing out their relative merits and weaknesses. Design is a difficult concept to convey, since so much depends on the "eye" of the individual. But, through the use of numerous examples, the author does a commendable job.

There are four modules which investigate in detail four of the most common yearbook layouts: Mosaic, Mondrian, Modular and Columnar. Through extensive use of Hi-Res graphics, the basics of each of these formats with variations and common pitfalls are displayed with accompanying text to reinforce the user's learning.

The Copy Fitter is a module to assist the user in determining whether copy will fit in a desired space or, alternatively, how much copy is needed to fit a given space. My experience as a yearbook adviser has shown that copy-fitting is not an exact science. Since one depends on formulae supplied by yearbook companies to fit copy, the best that can be said is that this process is an educated guess. The only way to fit copy exactly is to set the type yourself. However, this module does assist in the mathematical calculations involved in attempting to fit copy. As I am sure Mr. Van Dyke is aware, it will not teach a student HOW to write!

The Layout Practice module is designed to give the user practice in designing a layout and displaying same — again, using the Apple's Hi-Res graphics. Unfortunately, the author has used the Apple's ridiculous system of Cartesian coordinates with the origin at the upper left of the screen. Yearbook layout sheets are laid out in picas. It would have been a nice improvement on Apple's design approach to allow the user to enter pica measurements and have the program do the conversions to Cartesian points.

Also, I question the usefulness of plotting a layout on the screen — especially without the prompts to save the layout to disk or to dump it to a printer.

All things considered, YEARBOOK PRODUCTION SKILLS is a useful program for the new yearbook instructor or student of yearbook design. Although its audience is obviously limited, more of this kind of speciality programming is needed.

One last constructive comment: It would have been better to include a menu to run the programs rather than have the user type in "RUN COPY FITTER".

UTILITY PROGRAMS

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UTILITIES

Utility programs are an integral part of making the best and easiest use of the Apple Computer. They run the gamut from disk repair programs and shape table builders to mathematical programs and assemblers. Some of these programs are extremely useful and will save the user hours of tedious work, if not frustration.

But what does one consider important programs when one looks at the dozens of offerings that fill the dealers shelves? Of course it depends on your needs and in what programming language one usually writes. For Basic programmers, one needs a good line editor. Machine language programmers need a good assembler and possibly a linkage editor.

Owners of disk drives need programs that manipulate files from one disk to another and owners of just one drive need a single disk drive copy program to back up disks. More advanced users might consider disk utility programs that are capable of editing and rewriting sectors on the disk.

Hi-Res graphics programmers definitely need a good shape table maker and editor and, possibly, if they don't own a graphics tablet, a graphics package for creating Hi-Res pictures. For those who want to work in the third dimension, there are several programs that will create, rotate and animate three-dimensional pictures.

Of course, there are those who like languages. There are programs offering a more structured Basic. Others offer versions of Pascal and Forth. And finally, there are the mathematical utilities that help the engineer or scientist solve formulas or equations simply.

The utility program market has literally burgeoned in the last year. Programs which were developed by individuals to make their work easier and which were traded among friends have been refined and offered commercially. This next year should produce programs that will meet every user's needs.

APPLESOFT UTILITIES

UTILITY CITY

Company: Beagle Brothers
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29.50
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B+	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B+

Utility City is a collection of 21 utilities, some useful and some not, that assist Applesoft programmers. While some have been around for years in the public domain, a few are brand new. The authors assembled what they felt were the most needed utilities, and did it at a reasonable price. The programs can be divided into several categories. I will try to describe their content as well as give a critique of each.

There are a number of Applesoft utilities that enable the programmer to hide critical code from prying eyes. While these utilities don't prevent others from copying the material, they sure puzzle other programmers who wonder how it was written. Command Zap allows invisible commands or REM statements in your program. It is simply done by control H's (backspaces) in the program. However, this only works while listing to the screen. Paper printouts show the ruse rather quickly. There is also a similiar utility called REM Zap that works just with REM statements, and one called File Name Zap that can hide program names in the catalog. Another program called Bigliner renumbers Applesoft programs to lines above 63999 so that they are inaccessible to most people.

One of the more practical utilities called Screenwriter helps you format text screens that can be saved to the disk and then BLOADed for later use. You can create layouts that include NORMAL, FLASH, or INVERSE lettering. Text can be right justified or centered automatically, or even moved as a block. One nice feature is a flashing Hi-Res grid that can be superimposed over the text to help you with the formatting. All formatting and commands are made through control characters. They imply that cursor movement without typing is with the two arrow keys and the A and Z keys, but what works are the control A and control Z keys.

The package includes a utility for decimal-hexidecimal conversion that doesn't interfere with your current program. The program is EXECed into memory in a safe place, performs a few quick calculations, then returns you to your program. There is a program called Double Loader that runs another utility in memory without destroying the first. Another called Int Converter converts an Integer BASIC program to Applesoft without checking syntax. Connect allows you to join two Applesoft programs together as long as the range of line numbers don't overlap. Line Search helps one locate any particular Applesoft line in memory. It actually is only useful if your program has been somehow garbaged, although several people who understand the tokens have created illegal lines. Sortfile sorts alphabetically and stores a list of items on a disk. It is good as a small database for a list with one or more fields. However, this program can only sort on the first few letters of a single line.

There are two catalog utility programs on the disk. Multi-Cat allows you to list programs several columns across to the printer or screen. The format is user specified. Key-Cat allows you to select and run programs with one keystroke from your catalog. It also gives the amount of free space on the disk.

Xlister is a utility to produce easy to read Applesoft programs either on screen or to the printer. It separates multiple statement lines into separate lines. There are even page breaks. And finally, there is a Text Dump program that will dump whatever is on the text screen to the printer. It is appended to the end of your program and accessed via a GOTO 63900.

This brings us to the subject of documentation. While errors and changes are usually provided as an errata sheet, the authors resort to a program called Buglist on the disk for this information. They missed a few. On the whole the documentaion is good and is the final part of Tip Book #3, a booklet of some good and some useless programming tips. The authors also include a chart of useful Apple memory locations.

APPLE-DOC

Company: Southwestern Data Systems
Language: Applesoft (ROM or RAM)
Hardware Requirements: 32K & Disk

Department: Utilities
Sugg. Retail: $49.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	A	USEFULNESS	A
VENDOR SUPPORT	B+	ERROR HANDLING	A	VALUE FOR MONEY	A–

APPLE-DOC is an extremely useful program development and documentation package for programs in Applesoft Basic. The capabilities it provides are in the following five areas:

1. VARIABLE CROSS-REFERENCE – The program examines an Applesoft program and produces an alphabetized list of every variable referenced, together with every line number on which the variable appears.
2. VARIABLE DESCRIPTIONS – The user can optionally construct and save a data base of text descriptions of some or all variables as described in 1. above. A listing of this data base can provide the basis for program documentation external to the Basic program itself.
3. LINE NUMBER CROSS-REFERENCE – APPLE DOC can similarly produce an ordered list of every line number called by a GOTO, GOSUB, etc., together with the lines from which each is called.
4. LINE NUMBER DESCRIPTIONS – These can be entered into a documentation data base in the same manner as those for variables.
5. GLOBAL/SELECTIVE REPLACEMENT – The program facilitates automatic global or selective replacement of variable names, constants, strings, etc. in the user Applesoft program.

APPLE-DOC is a very useful product for program development. In fact, it is currently being used by at least one software house for documentation and development of its software line.

The documentation is well laid out and straight-forward, making it easy to use. There are examples for each program to allow the new user to become familiar with the program fairly quickly.

All in all, this package is highly recommended for the serious programmer, as well as for just about anyone who programs in Applesoft.

LISTMASTER

Company: Southwestern Data Systems
Language: Applesoft
Hardware Requirements: 48K & Applesoft in ROM

Department: Utilities
Sugg. Retail: $39.95
Availability: ?
Disk: Copy protected, 3 backup copy capability

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	A	USEFULNESS	A
VENDOR SUPPORT	A	ERROR HANDLING	A–	VALUE FOR MONEY	A

LISTMASTER is a utility diskette that contains four extremely useful programs for APPLESOFT program development authored by Ted Birkhead and Roger Wagner. The programs and their features are as follows:

1) APPLESEED – A program optimizer that gives the user the option of shortening variable names, combining program lines, stripping out REM statements and renumbering a program by ones. This both shortens a program and optimizes its execution speed. May be used as a pre-compiler.

2) RENUMBER PLUS – A renumber utility that offers the option of specifying parameters and specific blocks of code for renumbering. Allows the user to retain the logical structure of a program when desired and preserve logical blocks of number for routines.

3) LISTER – A program that facilitates neat and orderly program listings, allowing the user to specify name and date banner, top, bottom, left and right margins (even if your printer does not support these functions). It also provides a means for creating a text file of any APPLESOFT program for processing by a text editor. LISTER also supports transmission over a modem with the proper utility software.

4) COMP-LIST – A utility that will make a comparison listing of two Applesoft programs stored as text files and print out or store as a text file (your choice) the difference between them.

The programs are well done and very useful. The accompanying documentation is well written and easily understood. Error handling is very good, with documented error codes for RENUMBER PLUS. An excellent addition to your utility library at a very reasonable price.

PROGRAM LINE EDITOR

Company: Synergistics
Language: Machine
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $37.50
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	A	USEFULNESS	A
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A

If there is one utility that is a must have for those that do their own Integer or Applesoft Basic programming, it is PROGRAM LINE EDITOR. The Apple's cursor control is just not versatile enough for doing complex editing and performs in an awkward manner for inserting characters in a line.

While there have been some simplistic freebie editors that work on short lines of code, none match the versatility of Neil Konzen's PROGRAM LINE EDITOR. His editor can save the programmer a considerable amount of editing time. Many programmers use the Applesoft or Integer versions as their HELLO Program.

The PROGRAM LINE EDITOR is placed in memory between DOS and the DOS I/O Buffers. Essentially, HIMEM has been shifted down 611 bytes. It rarely has an effect on one's program during execution, but if this does occur, there is a program called REMOVE PLE that will reset the HIMEM before execution.

Normal editing commands are accessed by a Control E, followed by a line number. The line is displayed in 40 columns across, ready to edit. Other control characters allow one to pack a line if it is too long, delete extraneous spaces, move the cursor to the beginning or end of the line, insert or delete characters, re-edit the line if one has blown it completely (a lifesaver), delete from the cursor to the end of the line and use a find mode for locating, for example, the third colon (:) in a line.

The program also has a series of built in escape functions plus a program for creating one's own functions. The PROGRAM LINE EDITOR includes the normal escape functions for both normal and Autostart ROMs and defined functions that will do a list and catalog automatically, return the computer to page one text, clear the screen, enter the monitor automatically, print the value of any 2-byte memory location and calculate the start address and length of the last BLOADED file in memory. Escape functions can be created with limitless possibilities.

This utility program is thoroughly documented and is an important addition to anyone's library.

GLOBAL PROGRAM EDITOR

Company: Synergistic Software
Language: Machine Language
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $64.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	N/A	USEFULNESS	B+
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B+

Global Program Line Editor is an enhanced version of the original *Program Line Editor*. Besides having one of the most versatile line editors for editing BASIC programs in either Applesoft or Integer, this version includes features that do global search and replacement within an entire program. The utility also supports lower case, and five of the most popular 80-column cards. And those that have language cards may choose to relocate DOS onto the card and place the *GPLE* in the second memory bank.

The *Global Program Line Editor* is placed into memory between DOS and the I/O buffers. Essentially, HIMEM: is shifted down 4096 bytes. While this effectively cuts the maximum memory available to your BASIC program by 4K, the convenience of having the extra features is often worth it.

Normal editing commands are accessed by a Control-E, followed by a line number. This displays the line in 40-column format, and is ready to edit. Other commands allow you to go to the beginning or end of the line, insert or delete characters, pack the line if it is too long, find a character within a line, and re-edit the line if you have ruined it (a lifesaving feature). One of the newest features allows you to re-edit an Integer BASIC line that was not entered properly because of a syntax error. One of the best features of the editor lets you enter the line irregardless of your cursor position, or whether or not you have edited the line, by a simple carriage return.

The global features enable you to specify a range of lines to be edited, search for a specific string throughout an entire program, or just within a range of lines. The global replacement feature simplifies the mass change of variable names within a program. The search can be made when you monitor each replacement, or in an automatic mode.

The utility has a built-in set of macros accessed by the ESC function key. The program comes with a predefined set using nearly all of the 1152 available bytes. These include functions that will make a list and catalog a disk automatically with one keystroke. Others clear the screen, enter the monitor automatically, return the computer to page one, and calculate the start address of the last BLOADed file in memory. Escape functions can be created with limitless possibilities.

GPLE is an outstanding utility that is thoroughly documented in a thirty-two page manual. Its two best features are its logical command structure, and its extreme ease of use. It is almost a necessity to anyone who does an extensive amount of BASIC programming.

APPLE SPICE

Company: Adventure International
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29,95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**A –**	DOCUMENTATION	**A**	RELIABILITY	**A**
EASE OF USE	**A –**	VISUAL APPEAL	**N/A**	USEFULNESS	**A –**
VENDOR SUPPORT	**B**	ERROR HANDLING	**A –**	VALUE FOR MONEY	**A**

Apple Spice is a tool to enhance the capablities of Applesoft, making it compatible with more advanced BASICS. Essentially, what is missing in Applesoft is the PRINT USING function, the IF-THEN-ELSE statement, and a faster method for scanning string inputs for a particular string of characters. Apple Spice remedies these deficiencies by linking these routines via the & and USR functions in Applesoft.

PRINT USING is a handy feature in most BASICs that allows numeric output to be precisely formatted. For instance, this would allow columns of figures in dollars and cents to be precisely aligned at the decimal point regardless of the size of the dollar amount whether it was a positive or negative sum. This is easily accomplished by substituting the usual print statement with one using the ampersand as in the following example: &PRINT "###.##", AMOUNT. AMOUNT in this case is just the dollar amount. There is also a useful option that allows you to string together a group of numbers separated by exclamation points in one program line, and using the PRINT USING function to align them vertically according to your specifications.

The IF-THEN-ELSE function works as in other BASICs, except that when the condition fails the ELSE allows more than one program statement to be executed rather than the usual single statement. Normally when the condition fails in Applesoft, program flow jumps to the next line. This statement will allow you to execute several more statements on the same program line that follows after the IF portion of the line. Nested IF-THEN-ELSE statements are allowed in this version.

There is a string search routine that is much faster than using a MID$ in a DO loop. It returns the string and its position in the input line. This routine is useful in interactive programs where it is looking for one or more input strings on which to base its answer, such as in pseudo-psychiatric programs.

The package also contains a screen output module that allows string output to wrap on each word rather than be arbitrarily split on the right side of the screen. It can also do this on an input string. In addition, it will erase characters upon backspacing. This is handy for user friendly programs.

These routines can be incorporated into any BASIC program. These modules can be separated and relocated in memory. Normally, these routines are placed just below the 32K boundary so as not to interfere with utilities such as the Program Line Editor. However, these can be relocated by specifying HIMEM: before using the relocator.

This is a very detailed tutorial with many examples in its 48 pages. The documentation is quite good. The instructions are easy to follow and make implemention simple. Overall the package is useful and a powerful expansion of Applesoft.

APPLESOFT OPTIMIZER (AOPT)

Company: Sensible Software
Language: Applesoft (ROM or RAM)
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $20.00
Availability: 9
Disk or Tape: Tape

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	B	VALUE FOR MONEY	B

APPLESOFT OPTIMIZER provides a kind of first-order optimization for Applesoft Basic programs. The user may invoke either one or two optimization procedures by using the '&' (ampersand) vector feature. Features include:

1. VARIABLE NAME OPTIMIZATION — The program automatically renames all variables in the user program to unique one-or-two character variable names. Long variable names with the same first and second characters (treated as the same variable by Applesoft) are converted into distinct names that Applesoft can process separately. Besides reducing program length, this feature can be useful if, for instance, Integer Basic programs are to be converted into Applesoft versions. The program is a bit heavy-handed in that the new, shorter names probably bear no mnemonic resemblance to the old names.

3. REMARK DELETION/LINE COMPRESSION — Remarks, extra colons, and unreferenced lines in the user program are deleted, shorter lines are automatically combined into fewer long lines, and the program is automatically renumbered from one by one to save memory. (Unfortunately, these functions are not separately available as options.)

The APPLESOFT OPTIMIZER provides a potentially useful if somewhat radical approach to reducing program size and increasing execution speed.

AXE (APPLE EXTENDED EDITOR)

Company: Versa Computing
Language: Machine Language
Hardware Requirements: 48K; Applesoft ROM.

Department: Utilities
Sugg. Retail: $69.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	N/A	USEFULNESS	B+
VENDOR SUPPORT	B–	ERROR HANDLING	A	VALUE FOR MONEY	B

Advanced Extended Editor (AXE) is a program line editor for Applesoft programmers. It greatly enhances the limited line editing capabilities of the normal BASIC editor. Besides having an extended editor with numerous features, it offers search and replace commands for both tokens and ASCII strings, auto line numbering, and complete listing control in a variety of formats.

Of course, *AXE*'s most important feature is its editor. A line is edited by typing E#line number from the Applesoft prompt mode. You should understand first that listing control can either be by individual statements, one each per line within a line number, or in the normal packed mode. The same applies to the editing mode. Statements can be copies, or deleted by row with simple control commands if you are not in the packed mode. However, in the packed or normal mode, you can't simply press the carriage control key when you are done editing, or you will delete everything beyond the current cursor position. The Control-W key copies the rest of the line. The usual insert and delete modes apply not only in the edit modes, but when entering the initial Applesoft line. There are other commands for finding a character within a line, and for re-editing the last line you worked on. No, this does not restore a badly edited line that you made mistakes on. In that case, it is best to abort before you enter the line.

AXE has a number of features that can be directly accessed from the Applesoft command prompt. Lines can be entered in an auto number mode. The status of available memory in the Applesoft program can also be checked, or you can enter the monitor to do this.

The utility as a macro feature that simplifies the entering of repetitious code. Each macro contains up to 64 characters, and can be entered and edited with a macro editor. Many programmers save considerable typing time by inserting common keywords like PRINT or INPUT in the table. These can then be entered with a Control-K and the appropriate key containing the macro.

AXE resides just below DOS; it requires 3300 bytes of memory. It will not support an 80-column card. It offers editing features comparable to the *Global Program Line Editor* from Synergistics. It has some features not found in its rival product, but isn't quite as easy to use. Overall, this is a good product, very useful to anyone doing an extensive amount of Applesoft programming.

A.C.E.

Company: Southwestern Data Systems
Language: Applesoft in Rom
Hardware Requirements: 48K, DOS 3.3

Department: Utilities
Sugg. Retail: $29.95
Availability: *
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B+	USEFULNESS	A
VENDOR SUPPORT	A	ERROR HANDLING	A	VALUE FOR MONEY	A

A.C.E. or Applesoft Command Editor combines a program line editor with an enhanced version of Applesoft in the immediate mode. This means that the included utilities are available while entering or modifying programs. The package, which is 6.5K bytes long, effectively moves Himen down and is completely transparent to your Applesoft program.

A.C.E. is a powerful tool for speeding up the design and debugging of a new program. It includes commands that enable you to dump any portion of memory, display the number of sectors free on a disk, show the starting address and length of the last BLOADed file, give the current memory status, convert numbers from hex to decimal and decimal to hex, renumber programs, display the line numbers for which a variable appears, and dump the current variable table.

The ability to dump a variable table allows you to see the order the variables are used in the table. Obviously, if a variable that is being used often is at the bottom of the table, the Applesoft interpreter will take longer to find it and the program will run longer. Also by placing a break in your program, you can use the list as a debugger, since all current variable values are shown. We did find one annoying problem that occurs with names longer than two characters. Besides the name being shown as only two characters, trying to reference the line number associated with that variable doesn't work for either the long or shortened variable name.

Their line editor is adequate for easily editing program lines. One can insert and delete characters, as well as jump to any point with a find command. One can change only what is needed, then have the editor accept the line as changed without having to copy over the remainder. There is also a cancel mode that will return the original unedited line if one makes a mistake. The editor also allows you to define keyboard macros. If a Control-V is defined as VTAB, just pressing that key will print VTAB while you are trying your program. With up to seven letter macros, a programmer could save considerable time by typing commonly used Basic expressions like HPLOT.

A.C.E. is a very useful utility. A program line editor is a necessity. While Synergistics may have a more comprehensive editor, A.C.E. has a debug module that is worth the price of the program alone. The program will allow you to make three backup copies.

MISCELLANEOUS UTILITIES

DOS TOOL KIT

Company: Apple Computer, Inc.
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $75.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A–	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	A	USEFULNESS	A
VENDOR SUPPORT	C	ERROR HANDLING	A	VALUE FOR MONEY	A

Apple Computer Inc.'s new DOS TOOL KIT consists of five major segments:
(1) The Applesoft Programmer's Assistant
(2) Hi-Res Character Generator
(3) Animatrix
(4) The Relocating Loader
(5) 6502 Editor-Assembler

A) The APPLESOFT PROGRAMMER'S ASSISTANT does a number of things to assist you in writing and changing Applesoft programs:
(1) Merge files (Appending)
(2) Renumber programs
(3) Auto line numbering
(4) Display hidden control characters
(5) Length of program (number of bytes)
(6) Compress programs (removes REM statements)
(7) Additional keyboard characters: — underscore, back slash, left bracket
(8) Allows a cross reference listing of Applesoft programs (lists each variable followed by the line number)

B) HI-RES CHARACTER GENERATOR

This is a set of Assembly-language subroutines for displaying text on the Hi-Res graphics screen. The program's features include:
(1) Comes with 21 character sets (e.g., Greek, Katakana, Cyrillic, Roman, etc.)
(2) The user can create his own character sets.
(3) You may display upper and lower case text.
(4) Allows intermixing of text and Hi-Res graphics.
(5) Normal and inverse video
(6) You may write text over a background.

Also, within this part of the program are three games, namely RIBBIT, SKYLAB and MAXWELL, which demonstrate the use of the character generator and ANIMATRIX.

RIBBIT is an excellent animation program (arcade quality) that involves an animated frog in a pond that jumps up to catch passing butterflies. Paddles control the height of the jump, the direction the frog faces and its ability to hop after the butterfly. The entire game uses print statements with a character set that makes the figure of a frog and the figure of the butterfly.

C) ANIMATRIX

With ANIMATRIX the user can create and edit character sets for the Hi-Res character generator.

D) THE RELOCATING LOADER

Using this program allows the user to load relocatable Assembly-language modules from an Applesoft program so that the program can run on Apples of different memory sizes.

E) Apple 6502 ASSEMBLER/EDITOR

This program consists of three parts: the Editor, the Assembler and the Command Interpreter. The Command Interpreter is always in memory and is responsible for loading either the Editor or the Assembler into memory as they are needed.

(**NOTE:** This Assembler/Editor is described in detail in our Assembler section.)

MEMORY MANAGEMENT SYSTEM

Company: Computer Data Services
Language: Machine
Hardware Requirements: 48K, 1 or 2 16K Boards or Applesoft or Integer ROM card

Department: Utilities
Sugg. Retail: $40.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**B**	DOCUMENTATION	**B**	RELIABILITY	**A –**
EASE OF USE	**A**	VISUAL APPEAL	**N/A**	USEFULNESS	**B**
VENDOR SUPPORT	**B –**	ERROR HANDLING	**A –**	VALUE FOR MONEY	**B –**

The MEMORY MANAGEMENT SYSTEM allows you to relocate the Disk Operating System (DOS) to a 16K RAM board located in Slot #0. Since DOS normally resides in the upper 10.5K of the computer, it essentially frees this space for programming. This allows use of memory locations 2048-49151 ($800 - $BFFF) for Applesoft or machine language programs.

This program overwrites any other machine language program or data residing on the language card. If one owns an Apple II (integer machine), Applesoft is overlaid unless you put your old Applesoft card in Slot #4 (providing you aren't using the Z-80 Softcard). Since 80% of all machines are Apple II Pluses, this is not likely to cause a problem. However, The Apple II Plus has a similar problem with the Integer Basic language being overlaid.

Since DOS is displaced upwards by $3800 bytes and now resides at locations $D500 - $F7FF, all direct references (such as PEEKS, POKES or CALLS) must be recalculated. DOS is still easy to patch from the monitor, since all of the DOS routines are unchanged and have a new address $3800 bytes higher.

There are several minor limitations for programmers. The INIT command no longer exists, and page 3 locations, 807-1023, are not available for use since this is used as an interface area. Everything else works normally. This program is useful if you need to step beyond the memory limitations of an Apple II's capacity.

LINKER

Company: Quality Software
Language: Assembly
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $49.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**B+**	DOCUMENTATION	**A**	RELIABILITY	**A**
EASE OF USE	**B**	VISUAL APPEAL	**A**	USEFULNESS	**A**
VENDOR SUPPORT	**B+**	ERROR HANDLING	**A**	VALUE FOR MONEY	**B+**

LINKER is a linking loader/editor for the Apple II that can be used with virtually any 6502 assembler on the market. It has the following capabilities:

1. Dynamically LOADS AND RELOCATES your assembly language programs anywhere in RAM.
2. COMBINES A MAIN PROGRAM WITH SUBROUTINES to form a composite, executable program, allowing you to assemble a subroutine once and then use it in as many programs as you wish.
3. PRODUCES A MAP of all loaded routines, giving their location and the total length of the resulting module.
4. AUTOMATICALLY LOADS each subroutine as it is needed.
5. Will SEARCH MORE THAN ONE DISKETTE for subroutines if desired.
6. LOADS either UP from an address OR DOWN from an upper boundary.
7. ROUTINES are either PACKED together OR forced to EVEN PAGE ALIGNMENT at your option.
8. Can be called as a subroutine itself to LOAD PROGRAMS DURING EXECUTION and MANAGE OVERLAYS.
9. Comes with a starter LIBRARY OF SUBROUTINES including:
   Print text strings, Multiply, Divide, Format numbers for printing, Convert an ASCII number to binary, Delay in tenths of seconds, Tone generator, Random number generator, and Complete DOS text file access (OPEN, CLOSE, POSN, READ, WRITE).

LINKER is perhaps best utilized by experienced programmers; however, with some time and patience, it can be a useable tool for novice assembly language programmers. The program is fully documented and has examples of how to use its library subroutines.

SUPER SOUND

Company: Rainbow
Language: Applesoft/Assembly
Hardware Requirements: 16K

Department: Utilities
Sugg. Retail: $12.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	N/A	USEFULNESS	B
VENDOR SUPPORT	C	ERROR HANDLING	N/A	VALUE FOR MONEY	B+

SUPERSOUND is a utility that will enable game programmers who know nothing about generating sound by using machine language subroutines to add sound routines to enhance their programs. The disk has a demo that demonstrates 26 types of sound. These include a helicopter, noise sweep, whistling bomb, siren, phaser blast, explosion, cymbal rhythm and steam train. Each uses various routines: noise, variable upsweep and downsweep, tone mixing and tone generation. The calls to use these routines can be obtained by listing the demo. The routines are provided as two sets of binary files, one at $IC00 just below Hi-Res page one and another at A$4400 above Hi-Res page one graphics. Each is $400 bytes in length. Considering the limitations of the Apple Sound System, some of these disk sounds are nicely done.

ACTION SOUNDS & HI-RES SCROLLING

Company: Avant-Garde Creations
Language: Machine & Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $15.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	C	RELIABILITY	B
EASE OF USE	B	VISUAL APPEAL	N/A	USEFULNESS	C
VENDOR SUPPORT	C	ERROR HANDLING	B	VALUE FOR MONEY	A

ACTION SOUNDS & HI-RES SCROLLING is a group of machine language routines that can be incorporated into one's own program. There are 31 sound routines, including sounds for a teleporter, explosion, laser, foghorn, and machine gun, to name just a few. These are sounds that primarily can be used in shoot-'em-up games. To encourage the user to experiment with his own sounds, the source code is provided in the form of text files. They can be EXECUTED into the Lisa Assembler for examination and analysis, or reassembled in another location. These files are a disappointment, in that the listings don't include explanatory comments. For those who don't have an assembler, the files can be disassembled without labels using the Apple's monitor. The documentation provides an example of how one can modify a simple laser sound routine which is activated by a paddle button.

There are also a number of scrolling routines on the disk. They can scroll the screen left or right one byte (7 pixels) with or without wraparound, as well as upwards a total of eight lines (one normal character) or 64 lines (a third of the screen).

Source lisings are provided; but, again, these are uncommented. This is unfortunate, because scrolling is an interesting technique. The routines are not very efficient and consequently are very slow. An attempt was made to determine why, but the code was not very straight-forward and therefore difficult to decipher without comments. The disk also contains a Hi-Res character font program for putting characters on the screen for observing the scrolling option.

The disk is useful for adding simple sounds to game programs or as a start for creating one's own sound effects. On the other hand, programmers will probably find the scrolling routines of little use if they plan to use them in arcade animation.

THE BUG

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $50.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	A–	RELIABILITY	B+
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	A–
VENDOR SUPPORT	B+	ERROR HANDLING	B+	VALUE FOR MONEY	B+

The Bug is a powerful debugger which offers the qualities of a greatly extended monitor to the user. It can be relocated on any page boundary; or, optionally, it will run in bank 1 of a RAM card. Only 3 zero page locations may not be used by the programmer, enabling *The Bug* to be virtually invisible to user software. Perhaps the most outstanding feature of *The Bug* is its extensive breakpointing capability. Thirteen different breakpoints can be set, to halt execution upon reaching a specified memory location, or to stop either on a register or flag after reaching a particular value. Another feature is the ability to automatically execute lower level subroutines at full speed. Both of these routines are extremely useful.

Some additional commands might be welcome. However, *The Bug* is extremely powerful, and might be a best buy for those who currently do their debugging using the monitor.

MUNCH-A-BUG

Company: Southwestern Data Systems
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $49.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B+	RELIABILITY	B+
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	A–
VENDOR SUPPORT	B	ERROR HANDLING	B+	VALUE FOR MONEY	B+

Munch-a-Bug is a 6502 debugger modeled after *DDT*, the widely used CP/M debugger. It relocates itself below DOS, or may be run in a RAM card. Only four user-defined zero page locations are required, eliminating conflicts with user software.

Munch-a-Bug's unique "pass pointers" feature provides a powerful addition to its standard features. A "pass pointer" allows the execution of a machine language subroutine without affecting the main program, enabling complex conditional breakpoints to be created. The ability to define and connect a symbol table (labels) is another helpful feature.

A number of memory modification commands, a variety of screen displays, and many well-designed functions make *Munch-a-Bug* a fine debugging tool. Its convention of command followed by address (the opposite of the Apple monitor) is a minor point. *Munch-a-Bug* performs its debugging functions well.

BUG BYTER

Company: Computer Advanced Ideas
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	A	RELIABILITY	B
EASE OF USE	B	VISUAL APPEAL	A–	USEFULNESS	A–
VENDOR SUPPORT	B	ERROR HANDLING	B	VALUE FOR MONEY	A–

Bug Byter is an excellent debugging tool. It is totally relocatable, or it can be run in a RAM card, making it virtually transparent to the program being debugged. A user-definable display is one of its outstanding features. All 6502 registers and flags, a definable portion of the stack, mnemonic disassembly, selectable memory locations, breakpoints, and the command line are displayed simultaneously. This feature enhances the *Bug Byter's* effectiveness and makes it an excellent program for anyone learning assembly language programming.

One of the outstanding features is the variable speed tracing of software while watching the Hi-Res Graphics screen, a real benefit in debugging graphics routines. Cycle counting is also provided, a great help for writing timing-dependent code, or determining the fastest way to code a particular routine.

Bug Byter does have several limitations: its excellent screen display makes hard copy output impossible; further, it lacks conditional breakpoints. Nevertheless, it provides a very good value for the money.

CHART EXPLANATION

All three debuggers were found to be good packages. Finding the one that best suits your needs may be largely a matter of personal preference. Each provided unique features that might assist a particular style of debugging; and all provided the standard debugging capabilities.

The following table is by no means exhaustive. However, it does list the majority of available functions. Note that in some cases similar functions are performed in quite different ways, and so occasionally missing functions can be simulated by other means. Those kinds of differences make the table more of a guide than conclusive summary. Nevertheless, it should assist you in comparing the three debugging programs.

DEBUGGING CHART

I. DISPLAY OPTIONS

	THE BUG	BUG BYTER	MUNCH-A-BUG
REGISTERS	✓	✓	✓
FLAGS	✓	✓	✓
MEMORY	✓	✓	✓
BREAKPOINTS	✓	✓	✓
DISASSEMBLE	✓	✓	✓
HARD COPY	✓		
LINK TO SYMBOL TABLE			✓
LOW-RES GRAPHICS		✓	✓
HI-RES GRAPHICS		✓	✓
GRAPHICS MODE	✓		✓
TEXT MODE	✓	✓	✓
MIXED [TEXT/GRAPHICS]		✓	✓
FULL SCREEN MODE		✓	✓
PAGE 1	✓	✓	✓
PAGE 2	✓	✓	✓
TURN OFF DISPLAY	✓	✓	✓
80-COLUMN			✓
DECIMAL-HEX CONVERSION		✓	✓

II. MODIFICATION COMMANDS

	THE BUG	BUG BYTER	MUNCH-A-BUG
REGISTERS	✓	✓	✓
FLAGS	✓	✓	✓
MEMORY			
ENTER HEX	✓	✓	✓
ENTER ASCII		✓	✓
ENTER OPCODE		✓	
FILL			✓
MOVE			✓
ENTER MONITOR	✓	✓	✓

III. BREAKPOINT

	THE BUG	BUG BYTER	MUNCH-A-BUG
MEMORY LITERAL		✓	✓
MEMORY TRANSPARENT	✓	✓	✓
MEMORY USER DEFINED COUNT		✓	✓
REGISTERS	✓		*
FLAGS	✓		*
CLEAR BREAKPOINTS	✓	✓	✓

*Pass pointers allow user to write code to do conditional testing.

IV. EXECUTION

	THE BUG	BUG BYTER	MUNCH-A-BUG
STEP/TRACE	✓	✓	✓
GO (CALL)	✓	✓	✓
EXECUTE JSR'S FULL SPEED	✓	*	✓
FULL SPEED EXECUTION	✓	*	✓
VARIABLE SPEED EXECUTION	✓	✓	
DOS COMMANDS	✓	✓	✓

*Allows setting range for full speed execution

V. GENERAL

	THE BUG	BUG BYTER	MUNCH-A-BUG
RELOCATABLE	✓	✓	*
RUNS IN RAM CARD	✓	✓	✓

*Relocates itself below DOS

LINKVIDEO

Company: Link Systems
Language: UCSD Pascal Source text
Hardware Requirements: 16K Language card UCSD Pascal 1.1

Department: Utilities
Sugg. Retail: $54.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**A –**	DOCUMENTATION	**A –**	RELIABILITY	**A**
EASE OF USE	**A**	VISUAL APPEAL	**B**	USEFULNESS	**A –**
VENDOR SUPPORT	**A –**	ERROR HANDLING	**A**	VALUE FOR MONEY	**B**

Linkvideo is a UCSD Pascal intrinsic unit, designed for terminal independent software development. Thus, software using this unit for screen control will work even if a new terminal is installed on the system, or on systems with differing configurations. All routines address the screen on a uniform X, Y system. Input/output routines are provided for string, Boolean, integer, long integer, date, phone number, and social security number fields.

The program comes in both a compiled unit and as source, so you can modify the program easily. The compiled code is then inserted into your system library using the Apple supplied library program. The unit may then be used by any program that you write, and provides convenience and uniformity to routine screen 10. An accompanying booklet describes the program and a well-documented program on the disk demonstrates the use of the routines available. All routines function as described in the manual, and could be helpful in programming text screen applications, common in business.

THE INSPECTOR

Company: Omega Software
Language: Machine
Hardware Requirements: 48K Integer or Applesoft with language card

Department: Utilities
Sugg. Retail: $49.95
Availability: 4
Disk or Tape: ROM or Disk

OVERALL RATING	A–	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	B–	USEFULNESS	A–
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A–

THE INSPECTOR is one of the most powerful utilities available for the Apple II. It is the first to combine an internal memory utility, which is capable of searching and editing RAM memory, with a disk utility that can read or modify data on disks. Since it is available as a ROM in the D8 socket on Integer boards or ROM cards, it is always accessible by doing a D800G from the monitor. Thus, without the necessity of loading the program, one can access anything in memory without actually disturbing what already resides in RAM.

This utility has a myriad of uses. One can easily search through a program in memory to find specific strings of data, either as a Hex or ASCII string. For example, one could find where all the paddle read routines were in a machine language program and change paddle #0 to #1, or one could track down the appropriate code to increase the number of ships available in a shoot-'em-up space game. The utility can read any sector on a disk and can be used to either repair blown disks by rewriting the catalog sectors, or one could edit the sector before rewriting it back to the disk. Since each sector can be loaded into RAM at any memory page, groups of disk sectors could be loaded into memory, and then be disassembled using the monitor, where they could be modified before writing the data back to the disk. Some semi-protected disks can also be modified. Although some examples are given to recover a protected data disk, it is an experimental method that won't necessarily work. If some disk sectors need decoding, the program's nybble reader might be of help in determining the problem.

THE INSPECTOR is a command-driven package. Therefore, one must learn the command sequences and their uses. The 22 commands are logically associated for recall; M for disk map, E for edit, etc. Omega Software has been very perspicacious in using Control W for writing to the disk. It prevents some inadvertent errors. When accessing particular sections of memory, one has a choice of display modes. Either hexadecimal or ASCII modes can be toggled for any page. The ASCII set can also be set to suppress flashing and inverse characters. Memory can be scrolled in a combination of both modes with one key stroke. The space bar will stop scrolling any any time, with several speeds available for display.

The program does not output display directly to the printer, However, Omega supplies a printer driver that can be typed into memory beginning at location $300. It interfaces with the ROM by using Control-Z.

The documentation manual clearly shows how to install this chip in your D8 socket. The program is also available on disk for loading with Integer Basic into your language card for those that have an Apple II plus and a language card. This version can be a liability at times, since some programs will automatically stomp on your language card when booting.

The manual is comprehensive and gives clear examples of all functions. In many cases, screen dumps of the results are shown. There is also a good appendix which explains how nybbles are formatted and read from a disk, with examples of how various disk problems can be corrected using this program.

In summary, THE INSPECTOR is an excellent utility for the serious programmer. It is a reliable and trouble-free tool for those that know what they are doing. Its ease of use makes an excellent choice for those who like to work extensively with the internal processing of Apple disks and software.

LINKINDEX

Company: Link Systems
Language: USCD Pascal Codefile
Hardware Requirements: 16K Language Card USCD Pascal 1.1

Department: Utilities
Sugg. Retail: $149.50
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**A–**	DOCUMENTATION	**A–**	RELIABILITY	**A**
EASE OF USE	**A**	VISUAL APPEAL	**B**	USEFULNESS	**A–**
VENDOR SUPPORT	**A–**	ERROR HANDLING	**A**	VALUE FOR MONEY	**A**

Linkindex is a UCSD codefile to be installed as a regular unit in the System library. The programmer can then use the various declarations and functions of *Linkvideo* as though they were already declared. The functions provided will allow the creation and referencing of a B-tree index of any Pascal data structure.The Linkindex routines will create and maintain complex indexes. Your program meanwhile creates and maintains the datafile, using the indexes provided by the Linkindex functions. Moreover, all index file manipulation is transparent to the programmer. Since the user can define the data structures indexed, and Linkindex doesn't access user files, the programmer has complete flexibility in writing the program.

The B-tree is an efficient way to index any files on a disk. Many books on data structures and/or Pascal have sections describing their properties and uses. The functions in Linkindex permit almost any type of database to be constructed (given the limits of the Apple memory and disks). The functions provided are:

```
OpenBTree: (Treename: String;
            Mode: Boolean): Boolean;

EnterkeyinBTree: (Var Key: Keyfield
                  allowduplicates: Boolean): Boolean

RemoveKeyFromBTree: (Var Key: Keyfield): Boolean

GetNextKey: (Var Key: Keyfield): Boolean

GetPriorKey (Var Key: Keyfield): Boolean

CloseBTree
```

In addition to the above functions, a number of datatypes are defined.

Included in the package is a 50 page booklet and a well documented program using *Linkindex* to maintain a file of telephone numbers. The booklet is fairly detailed, and tells how to use and install the unit and index organization. The effects of record (node) size on memory space, and error codes are also covered. All *Linkindex* functions worked properly when I tested them; however, I could not test all possible combinations.

This is a well thought out product. The functions work well, the documentation is good, and there is room to use the Apple memory resources in any reasonable way. The limits of the *Linkindex* B-Tree system of indexing primarily involve those of the Apple's memory and disks. Each index used requires memory and disk space. Data disks could easily be one quarter index if you got carried away in the number of cross indexes generated. Storage media with larger capacity should give considerably better performance as the indexes can be more complex without noticeably reducing space available for data. This unit promises excellent performance with an 8" floppy or a hard disk.

DISK UTILITIES

SUPER DISK COPY 3.7

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $30.00
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B	USEFULNESS	A
VENDOR SUPPORT	B+	ERROR HANDLING	A–	VALUE FOR MONEY	A

SUPER DISK COPY 3.7 is an exceptional utility package that allows manipulation of all types of disk files under DOS 3.1, 3.2 and 3.3. While the program may be unable to copy most protected disks, it is capable of copying everything else, including Pascal and Fortran disks. It has three copy modes for entire disks; one of these modes can copy from DOS 3.2 to 3.3 or back again and work with either one or two disk drives. 1) It will make a contiguous copy of the contents of a disk whose file sectors are scattered over various tracks and lay them down in a straight line contiguously on the target disk. 2) It can make a quick copy where only used sectors are copied, or 3) It can peform a brute force attempt to copy an entire disk. There is no guarantee that a protected disk's copy will run. Other copy modes include copying files from one disk to another (even if the disk's DOS structure is not the same) and copying just the DOS from one disk to another.

The program has many other helpful utilities. One can alphabetize all of the file names on a disk, remove DOS to allow more space for extra programs or data, undelete a deleted file, correct the file sizes for all the files on a disk (if one saves a file that is shorter with the same name, the extra files are not freed in Apple's DOS), shorten the catalog to a maximum of 70 names (frees five sectors on a 16 sector disk for data), replace strange and unseen characters in the catalog, and produce a map of the used sectors on a disk.

This program makes the conversion of DOS 3.2 files to DOS 3.3 simple. It has the same wild card features of FID, MUFFIN, and NIFFUM, and performs all the features of these three programs. The documentation is clear and complete. The program does extensive error checking and will even check for data on the DOS sectors before it will reinstall DOS on those tracks.

One would find it difficult to fault this program in any way. It combines in one program all the commercially available DOS utilities and many of the programs that make the rounds in private circles and clubs. This is a definite "must have" utility package.

DISK ORGANIZER

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $25.00
Availability: *
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B+	USEFULNESS	C
VENDOR SUPPORT	B+	ERROR HANDLING	A	VALUE FOR MONEY	B

A disk's catalog can be customized with DISK ORGANIZER. The program will allow you to alphabetize or move single files around in your catalog. It will also allow you to undelete deleted files if the file's sectors are still free, or purge deleted file names permanently from the catalog sectors. One can even rename files using characters that would cause an illegal file name, thus producing inverse or flashing characters.

Since the entire catalog is placed into RAM memory during the editing phase, one can change his mind and abort before the catalog is rewritten to the disk. The program is menu-driven and can be used on either DOS 3.2 or 3.3 disks as well as disks formatted for Muse programs.

BENEATH APPLE DOS — BAG OF TRICKS

Company: Quality Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B+	USEFULNESS	A
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A

Written by the authors of the best-selling book, "BENEATH APPLE DOS," this companion package incorporates four machine language utility programs that go far beyond those included in the book. Although the programs appear to be at a level which would make them very useful to an experienced Apple user, the documentation provided contains good "hand-holding" tutorials to assist the novice in repairing his damaged diskettes.

A track dump/examine program (TRAX) appears first on the menu. TRAX will read any track on a diskette and display the internal Apple diskette formatting information while flagging exceptions to standard formats. It is particularly useful in locating the specific cause of disk I/O errors or for learning about diskette formatting. It offers several display modes and handles 13-and 16-sector formats as well as non-standard formats.

INIT will reformat one or more tracks on a diskette while attempting to preserve any data remaining on them. *Both 16-* and 13-sector formats are supported. INIT can be particularly useful in repairing damaged sector formats on a catalog track or in a file.

ZAP provides basic capabilities for reading, displaying and updating diskette sectors. Its features clearly exceed those of similar utilities on the market for the Apple. More than 50 commands are provided with online HELP displays to assist the beginner. Full support is provided for 13- and 16-sector formats, as well as PASCAL and CP/M. Locations can be referenced either by track and sector number or (within a file) by relative record number and offset byte. Variables may be defined for holding disk address locations. A trace table is maintained for allowing the user to back up to sectors previously accessed. A complete 256-byte sector is displayed in both hexadecimal and ASCII (with various translation modes available). Sixteen internal buffers are provided, with multiple read/write commands allowing easy movement of data from disk to disk. The novice need not fear the power of ZAP since it has a "write-protect" feature that allows the beginner to experiment without damaging his diskette. Full printer support is provided with an optional audit trail of updates on hard-copy.

The final utility, FIXCAT, automates the process of recovering a damaged catalog track. Not only does it retrieve lost sectors by updating the VTOC map and recover accidentally deleted files, but it will also scan the disk for all files which do not appear in the catalog and allow the user to interactively and conditionally create catalog entries for them. This final program is well worth the price of the entire package for the novice who has lost a catalog on "that special disk".

It is likely that BENEATH APPLE DOS' — BAG OF TRICKS will become the standard for disk utilities for some time to come. It is almost inconceivable that an Apple II user who would not find at least one of the four programs invaluable.

TRACK & SECTOR LIST

Company: Softagon
Language: Machine Language
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	A–
VENDOR SUPPORT	C	ERROR HANDLING	A	VALUE FOR MONEY	B

Track & Sector List is an excellent disk utility program that will access the data on any sector of an unprotected disk, edit that data, and rewrite back to the disk. Information for each 256 byte sector is displayed in either HEX or ASCII by a simple toggle key. Movement between adjacent sectors uses a simple + or – key depending on direction and is extremely fast for quickly reading large numbers of sectors while looking for bad sectors which might be causing I/O errors on the disk.

Perhaps the best thing about this program is the excellent tutorial that not only explains how disks are formatted in lengthy detail, but enables the user to change the disk volume number, undelete a program, find hidden control characters, fix a missing catalog entry, and protect a sector or track from access. There are detailed tables for the format of the VTOC, track bit map, track/sector list, and directory entry file.

A very worthwhile and foolproof program.

DISK RECOVERY

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $30.00
Availability: *
Disk or Tape: Disk*

OVERALL RATING	A–	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B	USEFULNESS	A
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A–

DISK RECOVERY "The Scanner" is a utility program that is used for recovering disk files after the disk has failed and the dreaded 'DISK I/O ERROR' message appears. It essentially scans the disk and looks for sectors that aren't formatted correctly. It then checks each file to see which one uses those sectors. One has a chance to delete the clobbered file, thus freeing the good sectors for later use. A "bad blocks" file is written to the disk and the VTOC is rewritten so that the bad sectors are never used again.

The program is also able to reconstruct the VTOC after it detects which sectors are actually not allotted to a catalog entry. This option will sometimes free garbaged sectors that weren't freed when a shorter program of the same name is saved on the disk.

The program is entirely menu-driven and easy to use. For programmers who don't know how to patch a damaged disk by hand, this is an excellent tool for either DOS 3.2 or 3.3 disks.

MASTERDISK

Company: Masterworks Software
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: DISK

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A–
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	A–
VENDOR SUPPORT	B–	ERROR HANDLING	A	VALUE FOR MONEY	B

MASTERDISK is a very powerful disk utility. It has been written in a manner that makes it friendly to the user and requires little background knowledge of DOS. It comes with a thorough user manual of the programs and a number of hints on how to apply the program to specific needs. The capabilities included on MASTERDISK are:

A. A powerful, user-oriented disk sector editor that does a number of things which allow the user to understand and change the contents of any disk, such as

1. EXAMINE – allows any sector to be displayed for the user.
2. DECODE – allows user to display decoded contents of VTOC, Directory, Track/Sector Table, Binary File, Basic File, or Text File sectors.
3. EDIT – allows any byte of a sector to be directly edited.
4. WRITE – writes sector to any location on a disk. An edited sector may be returned to its original location or may be moved to another location on the disk.

B. A fast single-drive copy program that copies only those sectors that are actually in use, thereby reducing copying time.

C. A VTOC/Directory maintenance program that simplifies the task of recovering from DOS induced file length errors, such as

1. UNDELETE – scans the directory of a disk and displays all deleted files found. Allows the user to undelete a file by picking one or more numbers on the list.
2. RECONSTRUCT - all fields on the disk are examined and their actual sector usage is used to recreate the disk VTOC, thereby eliminating any errors introduced in file lengths by DOS.

D. A screen print capability that can be used to print any screen display in MASTERDISK by pressing CRTL-Y.

MASTERDOS

Company: Masterworks Software
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: DISK

OVERALL RATING	**B**	DOCUMENTATION	**B–**	RELIABILITY	**A**
EASE OF USE	**A**	VISUAL APPEAL	**B**	USEFULNESS	**C**
VENDOR SUPPORT	**B–**	ERROR HANDLING	**B**	VALUE FOR MONEY	**B–**

MASTERDOS is a unique utility that customizes several aspects of the standard DOS. The options in this package include creating a personalized version of DOS on any standard disk. Application of this feature may range from amusement to disk security. The individual components of MASTERDOS are:

1. COMMANDS – standard and current values for all DOS commands are displayed. The user may enter a replacement set of commands that will be stored permanently on his disk.
2. ERROR MESSAGES – standard and current values for all DOS error messages are displayed. The user may enter a replacement set of messages that will be displayed by DOS when it encounters an error.
3. VOLUME NAME – The "VOLUME NUMBER" appearing at the top of each catalog can be replaced by any set of 13 characters.
4. BOOT PROGRAM – The name of the file that is run after DOS is loaded into memory on booting can be changed. The user is also allowed to specify the type of file for the boot program (i.e., EXEC, BINARY, or BASIC).
5. DE-DOS – The DOS image stored on the first three tracks of a disk may be removed to allow the space to be used for file storage. The amount of space reserved for directories may also be reduced. This will increase storage on a disk by about 12K.

All changes made to a disk by MASTERDOS will be permanent until changed again. An excellent user's manual is included that covers MASTERDOS operation, fundamentals of DOS, and many useful suggestions for the application of the programs.

DOS BOSS

Company: Beagle Brothers
Language: Applesoft
Hardware Requirements: 49K

Department: Utilities
Sugg. Retail: $24.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B**	DOCUMENTATION	**A–**	RELIABILITY	**A**
EASE OF USE	**B**	VISUAL APPEAL	**B**	USEFULNESS	**C**
VENDOR SUPPORT	**B**	ERROR HANDLING	**A–**	VALUE FOR MONEY	**B–**

DOS BOSS permits you to customize the DOS on your disks by allowing you to change the DOS commands and error messages. The DOS command table has a maximum total length. If one shortens several of the commands, then one could lengthen other commands; for example, RUN to START. Likewise, one can change the error messages or stop someone from saving your program with a "NOT COPYABLE" message.

DOS BOSS also allows you to customize your catalog. Catalogs can be listed by file type, in one or two column wide modes. The catalog type and volume numbers can also be customized to establish unreadable file types. In addition, the system allows you to format a menu through a program called KEY-CAT which will allow you to run or execute a program with a single keystroke.

The documentation is exceptionally well written. The authors give many hints and advice for changing DOS without the use of their programs. Both beginners and experimenters will find this program useful.

LINKDISK

Company: Link Systems
Language: compiled UCSD Pascal
Hardware Requirements: 16K Language Card UCSD Pascal 1.1

Department: Utilities
Sugg. Retail: $69.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A–	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B	USEFULNESS	A–
VENDOR SUPPORT	A–	ERROR HANDLING	A	VALUE FOR MONEY	C

Linkdisk is a basic disk utility for those using the UCSD Pascal system. The sectors of a Pascal formatted disk can be read, displayed and modified. The contents of each Pascal block (two sectors) can be displayed as hex or ASCII or both on the screen. The screen can then be modified, and the new version stored back on the disk. A feature of this program is that it can "translate" Applesoft Basic text files to Pascal format text files. To aid in this, the program will read and display Dos 3.3 disk catalogs.

This utility comes as a codefile to be used with the UCSD Pascal 1.1 System. The command lines all follow the UCSD convention of presenting one letter commands across the top of the screen. The thin manual with the disk documents the commands in the program, but doesn't cover any details of the directory format or give any detailed examples of its use. All documented functions work and no errors were detected during testing.

This program would be useful to a programmer using the Apple UCSD Pascal system. Without outside documentation, it would be difficult to use this program efficiently to repair damaged disks. The state of the art in disk utilities has progressed to the point where displaying and modifying the disk is automatically assumed. This program is most useful on disks that are abnormal in some way, but there are no features that would help recognize or help restore damaged disk directories. However, a damaged disk directory can be reconstructed by using *Linkdisk* to find all the files on the damaged disk and then entering them in the missing directory yourself. There should be some help from the utility program to do this. The program is difficult to use given the state of the documentation that arrives with the Apple Language Card system.

MULTI DISK CATALOG III

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $25.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B+	ERROR HANDLING	A	VALUE FOR MONEY	B+

MULTI-DISK CATALOG is a master catalog utility program designed to run under either DOS 3.2, 3.2.1 or 3.3. It is capable of cataloging one's entire disk collection and storing the information on a file on the disk. The file can hold 1000 program names. As each disk is inserted in the disk drive for cataloging, one gives it an assigned disk number. One can also give each program or subfile a two letter I.D. Code (ex., GA – game adventure). When all the disks are in memory, one can either ask for a complete listing or one can call for a list on any sort field, either Volume No., I.D. number, type of file – Integer, Applesoft, or Binary, or even by the number of sectors in a program. Yes, this program is the first to include number of sectors for each program. The list can be sent to either the monitor or line printer.

There is no doubt about it, this is the best and most versatile master catalog program available.

ASSEMBLERS

Merlin
Southwestern Data Systems
$64.95

Merlin is a co-resident editor/macro assembler; it is upward compatible with its predecessor, the *TED II +*. "Co-resident" means that both the editor and the assembler are simultaneously located in memory. This is a very attractive feature when trying to debug an assembly language source listing. You don't have to reload the source file from disk before re-assembling. Convenience is its major advantage, but it does limit the size of the source code. *Merlin* uses the extra memory on the language card to store itself, DOS, and the user's symbol table and object code. This allows source files to reach 30K, or about 1,500 lines of commented source code.

Merlin closely resembles the Apple Tool Kit's Assembler-Editor in its functions. This is no mere coincidence, since this series of assemblers began with a crude version developed by Randy Wiggington of Apple Computer, Inc. It underwent several rewrites by Call Apple members, evolving into *TED II +*, and was converted from Integer BASIC to machine code by Glen Brendon. He did his best to achieve compatibility with its predecessor as well as the Tool Kit, while incorporating macros and conditional assembly.

The editor is probably the best line-oriented editor for the Apple. Every imaginable command is provided, combined with a very flexible syntax structure. A relative line numbering scheme is used; and editing command operands may be a line number, a list of line numbers, and/or a range of line numbers. Commands are provided to list, add, insert, delete, change, or copy lines. The change command can be either local or global, and it will optionally prompt the user to verify each change as it is made. Tab stops may be set, using blanks or any other character as tabs, which allows nicely formatted listings and assemblies. The best feature of the editor, however, is the edit command, which prompts the user with one or more lines, allowing him through the use of Control keys to add, insert, or change text very easily. The command modes are exactly the same as those in the Program Line Editor, making it probably the best implementation of a local editor available.

The file interface module allows the use of most disk commands, with the exception of EXEC. Binary files are used for speed. They are not compatible for use with *PIE* and other editors. However, *Merlin* will read any Apple text files, including those from other assemblers such as Apple Tool Kit. Files can then be made compatible using its advanced editing features. All source files are saved to disk with an ".s" tacked on. Object files are saved under the assigned name.

The assembler is quite complete. In addition to standard 6502 mnemonics, Sweet 16 and extended branch opcodes are also supported. Zero-page addressing is handled more or less automatically, and there are several immediate operand types (hi, lo, ASCII, hex, decimal), with the decimal format being the default mode. Pseudo-opcodes include most of the standard types, plus some included for reserving space, control printing of the assembly listings, and several used for generating data constants and ASCII strings. Good support is provided for arithmetic and logical expressions. Divide and multiply operations have been reinstated in this version. Macros with conditional assembly (DO, ELSE, and FIN) have also been incorporated. Error messages are clear, and the listings can be halted or aborted at will. Symbol tables are listed both alphabetically and numerically unless the listing option is off. Chained assemblies are also supported. The PUT pseudo-opcode allows parts of a source file too large to fit in memory all at one time to be assembled. Since the allotted space for the symbol table and the object code is slightly more than 6K, portions of large object code files must be saved to disk (using the SAV pseudo-op). The ability to save portions of a program is useful in cases where there is more than one ORG. Incidentally, ORG and OBJ are independent of one another, a very thoughtful feature.

This assembler also comes with an interactive disassembler called the "Sourceror." It can disassemble Sweet 16 code as well as 6502 code. The interactive portion of the disassembly allows you to interpret sections of code either as hex data, ASCII strings, or as two-byte words. Once the code is properly disassembled, the source code is loaded into *Merlin* to be interpreted and read. It is the best disassembler on the market to date.

LISA 2.5
Sierra On-Line Systems
$79.95

The LISA (pronounced LÎ-ZA) interactive assembler, written in machine language by Randall Hyde is one of the best choices in assemblers for beginning assembly language programmers. It includes extensive features and provides one of the most complete and flexible selections of assembler pseudo-ops available. Since it is structured for beginners, it is designed so that the editor and assembler reside in memory at the same time. This allows a programmer to generate a source file, assemble it, and, if there are no errors, test it in memory without having to swap files on the disk. While this is satisfactory for small programs, the trade-off is that the programmer is limited to 4K blocks of object code. Source files do not present much of a problem, with 16K available on a 48K and 26K system using a language card. It is the responsibility of the programmer to make sure that the file size does not exceed these values while ensuring that each file is linked by pseudo-ops, especially while assembling object code larger than 4K.

The LISA criterion for an optimal assembler is that speed is all important. This philosophy results in advantages and disadvantages, however. The syntax editor scans source statement lines as they are entered and "tokenizes" them (to some extent) in a way similar to a Basic interpreter. It is this tokenization (or translation of the alphabetic sequences into compressed binary representations) which makes the LISA assembler so fast. Since some of the overhead required to decode a statement is taken care of when it is typed into the editor, the assembler can run many times faster (Hyde claims 20,000 lines per minute). In addition, tokenization also implies a certain amount of compression of the source text, meaning a larger file can be held in memory at one time. This compression is limited, however (only the mnemonics and the addressing modes are tokenized), and LISA's size (over 10K) pretty much offsets this advantage. The problem with tokenization becomes apparent when one begins using the LISA editor. A rather primitive line-oriented editor is provided, offering most of the necessary commands, but no scan-for-a-string command, no global change, and no local edit command is included (one is expected to use the rather cumbersome Apple II escape sequence cursor editing). Given such a limited editor, the first thought would be to use another editor (PIE, for instance); fortunately, a mechanism is provided to do just that. However, because of tokenization, files must be converted by LISA to and from the compressed format and written as text files before PIE can handle them. LISA's and PIE's text file handling is slow enough as it is without the added speed degradation of tokenizing and syntax checking. Therefore, as long as you can stay in LISA's editor, you are fine, but should you need or desire a better one — forget it.

It is much harder to find fault with LISA's assembler. In addition to being fast, it provides more functionality (short of offering macros) than almost any other. Sweet 16 opcodes and extended branch mnemonics are provided, as are hex, decimal, binary, and character-immediate terms and data definition pseudo-ops. In the area of string definition pseudo-ops, there is a provision for almost any kind of string the programmer can imagine, from simple ASCII with the high bit on to inverse or flashing. LISA allows for invoking DOS commands from *within* an assembly file and provides a capability for linking multiple segments of a very large assembly-language program together as separate files. Other unique features include the production of a sorted symbol table, a "reserve space" pseudo-op, and excellent error messages.

There are a few areas in which LISA is restrictive, primarily in its syntax. A separate pseudo-op must be used to define zero-page labels, and expressions will be defined as non-zero-page types if any of the terms or intermediate computations are recognized as non-zero-page varieties. This can get confusing. Hexadecimal formatting was chosen as the default base for numerics. Although some special immediate forms are provided to save typing ('a' instead of '#a'), the long form is not allowed. Another minor restriction is that comments must begin with a ";" character even though it is not syntactically necessary. As with most assemblers of its type, LISA does not provide an easy way to save the object code generated by the assembler to disk. Not only will it not assemble directly to a binary file, but it doesn't print the starting address and length of the assembly; the ORG and OBJ pseudo-ops must be carefully dealt with to avoid overwriting LISA or the source file.

This assembler also includes three utilities. XREF/65 is a cross-reference tool for labels. It provides the line numbers for each label and the lines they are referenced by. TRACE/65 is a debugging tool, while DISASM/65 is a non-interactive dissassembler for generating source files from 6502 object code. The source files for each of these programs are included for allowing the user to modify them.

On the whole, LISA is a good buy for the beginner or the low-volume assembly language programmer. If the limitations of the editor and the minor restrictions of the assembler do not bother you, LISA can be an excellent tool. For the high-volume programmer who makes many changes before a reassembly and consequently requires a new listing almost every time, speed must be traded for editing power. However for quick, iterative changes and reassemblies required by the beginner, LISA is ideal.

S-C ASSEMBLER II VERSION 4.0
S-C Software
$55.00 Disk Version
$45.00 Tape Version

One of the first assemblers available for the Apple II, *S-C* has established itself as a very popular utility for beginners. Written entirely in machine language, *S-C* is closely integrated with the Apple ROM, thus requiring less memory. It is also an easy-to-learn addition to the standard features of the Apple. Mininum hardware requirements are an Apple II with at least 24K (with or without a disk drive).

The primary design philosophy of the *S-C Assembler* seems to be to make coding in assembly language as much like Basic programming as possible. The editor provided is almost identical to a Basic line-oriented version, although there are a few differences. The cursor features of the Autostart ROM are included, even if your machine is an Integer-based Apple. It is possible to scan a program for strings, set the scrolling speed of listings to slow or fast, halt or abort listings, and renumber. There is also auto line-numbering, but it is not completely "auto." A CTRL-I feeds the user the next line number for each line to be renumbered. The editor does not support local or global change commands, nor any copy or move commands. On the positive side, the editor is fast and close enough to Basic's edition to make the transition easy for the novice.

In addition to the standard editor commands, most DOS commands are supported. LOAD and SAVE work exactly as they do in Basic. This implies that *S-C* will store your source code as a Basic program. This is not overly compatible with the rest of the world, especially if one chooses to use another text file editor to handle your files. Object files, however, are saved as binary files. There are also merge commands for joining multiple files in memory, and you can chain files during assembly.

The *S-C Assembler* itself is modest but adequate for most uses. A somewhat free-form approach is supported, although there are cases where there must be at least two blanks between fields and only one blank between op-code and operand. Sweet 16 op-codes are supported, but extended-branch mnemonics are not. Simple expressions are allowed, using immediate terms in decimal (the default mode) or hex (no binary mode). An equate pseudo-op function is provided and zero-page operand handling is more or less automatic; although, should you define your zero-page labels after their first use, it is possible to generate a non-processable program. The assembler always terminates when an error occurs. This isn't as annoying as it used to be, because assembler speed is greatly improved. It is approximately four times faster than earlier versions with the list option on, and nearly twenty times faster with the list option off. The assembler listing is nicely formatted, additionally it can be halted or aborted from the keyboard. A symbol table in alphabetical order is also provided. Some of the syntax used is hard to get used to if you are used to other assemblers. The same pseudo-op function generates both single-and double-byte data constants, making it easier to generate a two-byte value rather than a one-byte value. There is a non-standard immediate format for obtaining the most significant byte of a two-byte expression (by specifying /label instead of #/label). Thirty-two character labels are allowed; they have a function which allows local labels for more readable modular programs.

In addition to the editor and assembler, a very nice interface is provided for the Apple monitor. This feature, combined with the DOS command support means you never really have to leave *S-C* to do anything (except, perhaps, run a Basic program). You can load, edit, assemble, debug, run, and save a program; all within *S-C*. *S-C*'s documentation is oriented to the beginner, with several examples and two demonstration programs on the distribution diskette. A reference card is included. For the price, the *S-C Assembler* is probably the best choice for the Basic programmer who wants to learn Assembly Language with a minimum of effort.

APPLE TOOL KIT ASSEMBLER
Apple Computer, Inc.
$75.00

The Apple Tool Kit's Editor/Assembler is a professional package consisting of an Editor, an Assembler, and the Command Interpreter. It is designed for editing and assembling small to very large programs in 6502 assembly language. It features a relocating loader with provision for the incorporation of Disk Macros and a Linking Loader. The program is disk-based. That is, while the Command Interpreter is always in memory, either the editor or assembler is active while the source file is saved to the disk before the other module is loaded. Although this may seem slow and tedious for debugging small programs, it allows more room for source files (30k or 1500 lines of commented source code). This method also allows one to chain files together during assembly.

The editor is very similar to that of Call-Apple's Big Mac and the earlier Ted II + ; consequently, it is about the best line-oriented editor available for an assembler. Every imaginable command is provided, combined with a very flexible syntax. A relative line number scheme is used; editing command operands may be a line number, a list of line numbers, and/or a range of line numbers. Commands are provided to list, add, insert, delete, change, or copy lines. The change command can be global or local. Tab stops may be set for very nicely formatted listings and assemblies. The best feature of the editor, though, is the edit command which prompts the user with one or more lines, allowing him through the use of control keys to add, insert or change text very easily. The commands are similar to the Program Line Editor's commands.

The assembler, which is quite complete, is disk based (i.e., it will assemble only source code which has been previously saved to disk) and will store the resultant object code to disk. The assembler supports, in addition to all standard 6502 mnemonics, extended branch opcodes. Zero page addressing is handled more or less automatically, and there are several intermediate operand types (hi, lo, ascii, hex, decimal), with decimal being the default mode. Good support is provided for the expressions, (+ , − , /, *). Pseudo-ops include most of the expected ones plus opcodes to reserve space, control printing of the assembly listing, and several types to generate data constants plus ASCII strings. In addition, this assembler is the only one to handle or define DSECTS, a directive to define areas of memory used for data tables or command control blocks. This procedure doesn't generate any object code. The Apple Assembler also provides conditional assembly (DO, ELSE, FIN). Additionally, assembled code can be saved as relocatable object files. It can be stored in another area of memory with the use of a relocating loader. This is useful for programs that are run in different sized machines or when they are loaded from a Basic program. During assembly, the listing can be halted or aborted at will. Error messages are cogent. Symbol tables are listed both numerically and alphabetically. The assembler supports chained assemblies.

The Command Interpreter supports multiple command entries. It also supports all direct DOS commands; for those that need help, there is a HELP command which displays a list of valid commands. Overall, this entire package (which is part of a larger package which includes Applesoft programming tools and a Hi-Res character generator) is one of the most professional of the variety of assemblers.

S-C MACRO ASSEMBLER
S-C Software
$80.00

The people at S-C Software have upgraded their very fine *S-C Assembler II* into a professional package by adding both Macro capabilities and conditional assembly, and by improving their editor. With the ability to support a 16K language card (if present), the *S-C Macro Assembler* becomes a powerful tool for beginners and advanced programmers alike.

This is a co-resident assembler-editor. Because everything resides in memory simultaneously, there is no tedious swapping of files when moving from the editor to the assembler and back again. This is perfect for beginning programmers, who are apt to make serious mistakes when writing their source file. Assembly in this two-pass assembler is quick, and the assembler now pauses when it encounters errors instead of aborting as it used to, a welcome change.

The assembler offers a very fine line-oriented editor. The commands for single line editing include character insert and delete, moving the cursor to the next tab stop, or to move to the beginning or end of the line. The editor has full string search, global replace, copy lines, delete features for a range of lines, and a line renumbering function. I should mention that each line number has a four digit number starting with 1000. The regular assembler requires a CRTL-I to give you the next line number. The Macro assembler has an AUTO mode as well, which gives you the line number after the Return key is pressed from the previous line. Of course, numbers can be overwritten, and you can give it any line number you wish. Text files can be 24K in length on a 48K machine, and 32K long using an additional language card. This will allow you 1,600 lines of commented source code.

The assembler is quite complete. It has Macro and conditional assembly, supports Sweet 16 opcodes, allows for local labels, and allows the chaining of files. Extended branch mnemonics are not offered. ORG and OBJ are fortunately separated, as they should be. Both default to $800; but if you are careful, you can place them in a clear portion of memory between your text file and your symbol table. The symbol table starts at $1000 in the non-language card version, and builds upward. The text file is stored just below DOS, and builds downward. Choosing an alternative ORG is important if you have a long Object file. Listings are nicely formatted, and can be suppressed if speed is of importance. The symbol table is alphabetical. Thirty-two character labels are allowed, and local labels can be used for modular programs. There are a few nonstandard formats: for example, Immediate Format, for obtaining the most significant byte of a two-byte expression. It uses a "/" label, rather than a "#/" label.

A very good monitor is included in the package. All commands are usable from inside the *S-C Macro Assembler* by typing a dollar sign and the monitor command. It can disassemble, display and change memory or registers, and move blocks of memory. A program can be executed beginning at a label or memory address using the MGO command. If you intentionally hit RESET while testing a program, you can re-enter the assembler through a documented re-entry point.

The documentation is very good. It is lengthy (approximately 100 pages), complete, and comprehensible. It is meant for beginning programmers, and so supplies numerous examples. The only significant lack I noticed was this: while memory usage is clearly explained, it would have been helpful if it were also in map or chart form.

In sum, the *S-C Macro Assembler* is one of the best choices for both the beginning and advanced programmer. Its co-resident nature allows programs to be quickly edited, assembled, and tested, entirely within the framework of the program itself. Perhaps its ease of use is its most attractive feature.

EDIT 6502
LJK Enterprises
$99.95

EDIT 6502 is a co-resident assembler-editor suited to beginning assembly language programmers. Because the package includes a comprehensive monitor along with its own DOS, it is also advantageous to Apple II Plus owners who lack the Step and Trace features in the Integer Monitor ROM. Having its own DOS is understandable, since *EDIT 6502* uses a modified protected DOS yet writes source and object files to unprotected disks. Source files can either be text files or binary-like "S" files. It isn't quite standard, but it suffices.

EDIT 6502 has an adequate assembler. Besides handling the usual 6502 opcodes, it supports arithmetic expressions with no logical operators, and no local labels. Conditional assembly is included, but macros are not. There are twenty pseudo opcodes provided. Linked files are allowed using the LNK pseudo-op. Although ORG and OBJ can be specified separately, they default to $800. It is possible to assemble elsewhere in memory using the OBJ command, but the memory map doesn't clearly show where everything resides, particularly when more user space becomes available with the language card. However, the user can adjust the locations of the source, object code, and symbol table with HIMEM/LOMEM type commands.

EDIT 6502 has a good line oriented editor. Numerous control character commands allow insertion and deletion of characters, can quickly reach the beginning or end of a line, and search for a character. It also supports lower case during input. Other editing commands allow string search and global replace. Lines can be added, deleted, and copied.

The system monitor and dissassembler are quite extensive. They include all of the Apple Monitor routines and then some. There are the usual commands: step and trace, change registers or memory, and memory moves. There is also a disassembler, a string search in HEX or ASCII, and a valuable Hex/ASCII memory dump. In addition, Monitor commands read or write a sector. The relocater command may be useful for relocating code. Unfortunately, the instructions aren't very clear.

Speaking of documentation, I find the entire 44 page manual rather poorly written. Here is a package that could be perfect for the novice programmer in assembly language.Instead of showing examples of how to use the assembler, the author uses valuable space to explain his philosphy in programming. I'll agree that everything is concisely documented, but it is hard to find and hard to follow. The reference card is very amateurish.

The Reset procedure for re-entering *EDIT 6502* is undocumented. Perhaps they believe that their monitor, and not the Apple's, should remain in control. While this is a good philosphy, object files don't often run properly, and you must hit Reset to exit. Hitting Reset without an Autostart ROM in an integer machine while in this program is tantamount to starting over. The re-hook pointers should also be documented.

EDIT 6502 is an adequate assembler-editor. It is relatively fast and easy to use. It is good for a beginner-intermediate programmer who is writing short assembly language programs, lacks a monitor, yet does not need the complexity of an advanced macro assembler.

ASSM/TED 1.0
Eastern House Software
$169.95

The ASSM/TED 6502 macro assembler and text editor is an extremely powerful assembler and line-oriented editor package. Written entirely in machine language by Carl Moser, ASSM was, at the time of this review, the only assembler for the Apple II or Apple II Plus which supports macros and conditional assembly. If this wasn't enough, ASSM also produces relocatable object code and maintains internal (local) and external (global) symbol tables.

The TED editor (not to be confused with Apple's TED editor by the same name) is as powerful a line-oriented editor as one could wish for, while still maintaining syntax which is very compatible with Basic's mode of editing. An auto line-numbering scheme is supported as well as renumbering, copy lines, move lines, search for and/or count strings, and global change. A rather unique local edit command is also provided, making small changes to a line easier. Tab support is provided or statements may be entered free form to conserve space; they will be formatted in columns when listed or assembled. Upper/lower case is not supported.

TED's weaknesses show up in the file management support. TED was written to be used on either the PET, the SYM, or the Apple. Because of this, file loading and saving is complex and difficult. Although tape files are supposed to be supported, the Apple's inability to control the operation of the tape drive makes tape file access within TED next to impossible. TED stores its files on disk as if they were on a tape—there is a text file to describe the file, then one or more binary files which contain pieces of the program. The formats of these binary files is dissimilar to any which could be loaded into another, more powerful editor. Despite this restriction, all DOS commands are operable (including EXEC) and the file access, although complicated, is very flexible—parts of files may be loaded or saved. Beware, however, since it is possible to produce two lines with the same line number by doing this!

ASSM, the assembler, is loaded with a function command. Input is free format, 10 character labels are allowed, and Basic expressions may be used with any of the major mode types (decimal, binary, hex, character). Unlike most Apple assemblers, ASSM will generate its object code directly to the disk, memory, and/or tape. Using the default option, no memory object code is generated, avoiding ORG and OBJ hassles. Almost every imaginable pseudo-op is supported with the exception of a multibyte data definition (HEX). In addition, ASSM allows the specification of internal and external labels and generates relocatable object code (although the format of the object file is unusual, also a special loader must be written to run it.) If all this was not enough, ASSM also provides a modest macro capability with symbolic replacement for operands and conditional assembly. The implementation is reminiscent of the DEC PDP LSI-11 macro assemblers. The only really irritating restriction of this assembler is the fact that all zero page references must be preceded by a "*" character. Most Apple assemblers these days can automatically determine whether the operand is zero page or not. Other problems uncovered are that accumulator addressing must be explicitly specified (A is a reserved label) and most-significant-bit support is not provided for character strings.

The major failing of ASSM/TED is its documentation. The documentation provided is meant to apply to all versions of the program on any type of machine. This leads to conflicting references in the text, incorrect address boundary information, and a kind of lowest common denominator design. In addition, there are no charts or references for pseudo-ops, error messages are all "by the numbers" and one example listing to which the text refers is missing. There is very little documentation on the relocatability feature or on file chaining. If you are a novice machine language programmer, ASSM/TED is probably not for you.

All things considered, ASSM/TED is probably the most functional and well written assembler for the Apple. It is too bad it wasn't designed especially for the Apple and that its documentation didn't make it easier to use for beginners. Aside from these considerations, it is a very powerful package for the advanced and professional programmer.

APPLE II ASSEMBLER COMPARISON

I — GENERAL INFORMATION

NAME	COMPANY	PRICE	MIN. HARDWARE/SOFTWARE
MAE	EASTERN HOUSE	$169.95	48K, DISK
LISA V2.5	SIERRA-ON LINE SYSTEMS	$79.95	48K, DISK
S-C ASSEM. II 4.0	S-C SOFTWARE	$55.00	24K, DISK
MERLIN	SOUTHWESTERN DATA SYSTEMS	$64.95	64K, DISK
TOOL KIT	APPLE COMPUTER	$75.00	48K, DISK
S-C MACRO ASSEMBLER	S-C SOFTWARE	$80.00	32K, DISK
EDIT 6502	LJK	$99.95	48K, DISK

II — RATINGS

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
OVERALL RATING	A	B–	B	B+	B	A	B–
FUNCTIONALITY	A	B+	B+	A	B	A	B
EASE OF USE	A–	B–	B–	B	A–	A–	B–
DOCUMENTATION	B+	B–	C	B+	B	B+	D

III — DOCUMENTATION

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
COMPLETE INSTRUCTIONS	YES	NO	YES	YES	YES	YES	YES
WRITTEN FOR NOVICE	NO	NO	YES	YES	YES	YES	NO
SUFFICIENT EXAMPLES	NO	SOME	YES	NO	YES	YES	NO
REFERENCE CARD/SHEETS	NO	NO	YES	YES	YES	YES	YES

IV — FILE HANDLING

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
SPEED OF FILE ACCESS	OK	OK	OK	OK	OK	OK	OK
FILE TYPE [B,T,I]	B,T	B,T	B,T	T	B,I	B,I,T	B,T,S
COMPATIBLE FORMAT	YES	NO	NO,YES	YES	NO,YES	YES	NO
ISSUE DOS COMMANDS INSIDE OF PROGRAM	YES	YES	YES	YES	YES	YES	YES
PIECE FILE TOGETHER FROM SEGMENTS	YES	YES	NO	NO	NO	YES	YES
CASSETTE SUPPORT	NO	YES	NO	YES	YES	YES	NO
APPEND LOAD	YES	YES	YES	YES	YES	YES	YES
EXEC USEABLE	NO	YES	YES	NO	YES	YES	NO
UNMODIFIED DOS	YES	YES	NO	YES	YES	YES	NO

V— MISCELLANEOUS

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
RUN COMMAND	NO	YES	NO	NO	YES	YES	NO
BRK TO MONITOR OR MONITOR COMMANDS	QUIT TO MON	BRK	BRK	BRK	CMDS	CMDS	YES
RESET RECOVERY PROCEDURE	YES	YES	YES	NO	YES	YES	NO
USEFUL SUBROUTINES PROVIDED	SOME	LOADER	MANY	NO	TWO	FIVE	NO
UPGRADE POLICY	NONE	NONE	NONE	NONE	V.GOOD	V.GOOD	NONE
USE LANGUAGE CARD IF PRESENT	REQUIRED	NO	NO	NO	NO	YES	NO

VI — EDITOR

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
FULL SCREEN OR LINE ORIENTED	LINE	LINE	LINE	LINE	LINE	LINE	LINE
RESPONSIVENESS	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
TAB SUPPORT	YES	YES	NO	YES	YES	YES	YES
AUTONUMBERING OR LINE COLLECTING INPUT MODE	AUTO	AUTO	YES	AUTO	AUTO	AUTO	AUTO
REQUIRES 4 DIGIT ZERO FILLED LINE NUMBERS	NO	NO	NO	NO	YES	NO	NO
STOP/ABORT LISTINGS	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH	BOTH
LOCAL EDIT COMMAND OR APPLE CURSOR EDITING	EDIT SCRN	EDIT	A.C.E.	EDIT	A.C.E.	BOTH	EDIT
REPLACE A LINE	YES	YES	YES	YES	YES	YES	YES
SCAN FOR STRING	YES	YES	NO	YES	YES	YES	YES
LOCAL/GLOBAL CHANGE	YES	YES	NO	YES	NO	YES	YES
COPY/MOVE LINES	YES	BOTH	NO	YES	NO	YES	YES
SHOW MEMORY LEFT	NO	YES	YES	YES	YES	YES	YES
PRINTER SUPPORT	YES	YES	YES	YES	YES	YES	YES
USER COMMAND INTERFACE	NO	YES	YES	NO	YES	YES	NO
RENUMBER [IF APPLIC.]	N/A	YES	N/A	N/A	YES	YES	N/A
UPPER/LOWER CASE	YES	NO	YES	NO	NO	YES	YES
SYNTAX CHECK INPUT	NO	NO	YES	NO	NO	NO	NO
TOKENIZED/COMPRESSED PARTITIONING	NO	YES	HARD	NO	HARD	YES	NO

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
SPEED OF ASSEMBLY	FAST	OK	FAST!	SLOW	FAST	FAST	O.K.
STANDARD SYNTAX	YES	SOME	SOME	YES	YES	YES	YES
FLEXIBLE SYNTAX	YES!	NO	MIXED	YES!	SOME	YES	SOME
LONGEST LABEL ALLOWED	15	10	8	16	32	32	10
SWEET 16 OPCODES	YES	NO	YES	NO	YES	YES	NO
EXTENDED BRANCH MNEMONICS	YES	NO	YES	YES	NO	NO	NO
PAUSE/ABORT ON ERROR	YES	YES	YES	YES	ABORT	OPTION	YES
PAUSE/ABORT FROM KEYBOARD	YES	YES	YES	YES	YES	YES	YES
ENGLISH OR NUMERIC ERROR MESSAGES	ENG	NUM	ENG	ENG	ENG	ENG	ENG
SYMBOL TABLE PRINTED	YES	YES	YES	YES	YES	YES	YES
SYMBOL TABLE SORTED	YES	NO	YES	YES	YES	YES	YES
OBJECT ADDRESS/LENGTH PRINTED	YES	END ONLY	NO	NO	NO	NO	YES
IMMEDIATE OPERAND TYPES [HEX, DEC, CHR, BIN, MSB, LSB, OCT]	HDCB MLO	HDCBML	HDCBML	HDCB MLO	HDML	HDCML	HDCBML
ADDITION/SUBTRACTION IN EXPRESSIONS	YES	YES	YES	YES	YES	YES	YES
MULTIPLICATION/DIVIS. IN EXPRESSIONS	YES	NO	YES	NO	NO	YES	YES
DEFAULT BASE	DEC	DEC	HEX	DEC	DEC	DEC	DEC
TERM TYPES [HEX, DEC, CHR, BIN, MSB, LSB, OCT]	HDCB MLO	HDCBML	HDCB	HDCB MLO	DH	HDC	HDCB
LOCATION COUNTER TERM [*]	YES	YES	YES	YES	YES	YES	YES
NUMBER OF PSEUDO OPS	27	22	30	24	14	21	20
ASSEMBLY ORIGIN OP [ORG]	YES	YES	YES	YES	YES	YES	YES
OBJECT ORIGIN OP [OBJ]	HARD	YES	YES	HARD	YES	YES	YES
EQUATE OP [EQU]	YES	YES	YES	YES	YES	YES	YES
ZERO PAGE ADDRESSING HANDLED AUTOMATICALLY	YES	NO	YES	YES	YES	YES	YES
CHAR STRING OPS	SOME	FEW	MANY	FEW	SOME	SOME	SOME
RESERVE MEMORY OP	YES	YES	YES	YES	YES	YES	YES
TWO BYTE CONSTANT OP	YES	YES	YES	YES	YES	YES	YES
ONE BYTE CONSTANT OP [MSB OR LSB]	LSB	LSB	YES	YES	YES	YES	LSB
MULTIBYTE CONSTANT OP [HEX]	YES	NO	YES	YES	YES	YES	YES
LISTING CONTROL [EJECT, SKIP]	EJECT	EJECT	EJECT	YES	EJECT	EJECT	YES

VII — ASSEMBLER (Cont'd)

	MERLIN	MAE	LISA V2.5	TOOL KIT	S-C ASSEM.	S-C MACRO	EDIT 6502
TURN LISTING ON/OFF	YES	YES	YES	YES	YES	YES	YES
END OF ASSEMBLY OP [REQUIRED?]	OPT	OPT	REQ	OPT	OPT	OPT	OPT
LINK ASSEMBLY FILES	YES	YES	YES	YES	YES	YES	YES
SAVE OBJECT CODE AUTOMATICALLY	NO	NO	FIXED LEN	YES	YES	YES	NO
MACROS WITH SYMBOLIC REPLACEMENT	YES	YES	NO	NO	NO	YES	NO
UNIQUE LABELS WITHIN MACROS	YES	YES	N/A	N/A	N/A	YES	N/A
CONDITIONAL ASSEMBLY [IF, SET, ETC.]	YES	YES	NO	YES	NO	YES	YES
RELOCATABLE OBJECT CODE [EXTERNAL/INTERNAL LABELS]	NO	YES	NO	YES	NO	NO	NO
LOCAL LABELS/ VARIABLES	YES	NO	YES	NO	NO	YES	NO
OBJECT CODE TO DISK, TAPE, MEMORY	D,M	D,T,M	M	D,T	D,T,M	D,T,M	D,M

COMPILERS

APPLESOFT COMPILERS

Applesoft is the most popular language available on the Apple II computer. Because it is an interpretive language, one that requires a machine language program to supervise the execution of each individual BASIC line as it is used, it is rather slow when compared to the equivalent program in pure machine code. This is because the interpreter must scan the user's program while actually running in order to find the appropriate subroutines to do that chore within its own program code. In addition, it must scan the user's program for the next statement whenever it finds a branch instruction in a GOTO or IF statement. A better solution is to use a compiler to translate the BASIC program into machine code beforehand. That way the program will run much faster, because the scanning and decoding of the user's program is done only once, during compile time.

Four separate software companies are marketing compilers. They all compile Applesoft BASIC programs into object code that runs much faster than interpreted BASIC. Speed increases vary widely, and are often dependent on the structure and length of a user's program. In general, long programs using a large number of variables, and doing a great deal of logical branching within the program, will execute much faster as compiled object code. Programs that primarily use integer variables will also run considerably faster, if compiled by a compiler that offers an integer option. Users can expect overall speed increases of between two to ten times that of interpreted Applesoft.

Another important point, and one too often neglected by consumers, is the size of the final object code. All compilers expand the object code somewhat from the size of the original program. Machine code, by its nature, uses more memory than an Applesoft program, so you must bear in mind the tradeoff between speed and size. In addition, they all require run-time libraries. These range from 2K to 4K in size. Moderately large Applesoft programs, say of 45 sectors (10K), will expand to 20K or more depending on the compiler. It is highly likely that you will not be able to compile some programs due to lack of memory space.

There are a substantial number of differences between compilers. Their handling of strings and variables differ widely. Some allow common variable space, to make chaining possible between programs that are too large to compile in one chunk of code. All offer options through the use of "active" REM statements to control the placement of compiler code, to avoid interference with the Apple's high resolution graphics pages, and to allow certain variables to be evaluated in true math. Because all of the compilers have their own peculiarities and individual ways of handling the compilation, they are described in much more detail below.

TASC's Task Handling. In Microsoft's *TASC*, the user controls the locations of three memory compartments: the run-time library, the program itself, and variables. In the default order of things, the library sits at decimal 2051, the program follows directly at 6020, and variables occupy the space between the top of the program and himem. Numeric variables build upward from the top of the program, and strings build down from himem. Lomem statements in the source program are not compiled, because the bottom of the variable space is defined at compile time.

If you want to avoid clobbering areas of memory with your program, you can designate a starting address other than 6020. Either enter a specific number, or type HGR1 or HGR2 to begin your program at the first byte following either of the Hi-Res pages. The program itself must be a contiguous block in memory; *TASC* will not JMP it around areas that you want to protect.

If you specify an alternative location for the library, you will need to take note of its new address, because the library must be BLOADed separately from the rest of your object code at run-time.

To allow modularization with shared variables, *TASC* employs commands embedded in REM statements in the source program. The statement REM ! DEFCOMMON A,B,C would be ignored if the program were run through the interpreter. But it would instruct the compiler to allocate memory for three numeric variables in a protected global variable area. Other modules could gain access to these variables by means of a REM ! USECOMMON statement in their source listings. DEFCOMMON initializes global variables, while USECOMMON refers to them without reinitializing them.

All modules that use a particular set of global variables have to be compiled with the same starting address for the program space, because *TASC* allocates its common variable area at the beginning of this space. The global block is subdivided into two parts to separate numeric globals from string globals. Modules that call upon common variables do not have to use the same variable names. One module could define common variables A, B, and C, and another could access those same variables under the names D, E, and F. What matters is the order in which these variables are declared in the source's REM statements.

Within the common block, *TASC* allocates two bytes per integer variable and five per real; and it expects the programmer to keep track of what kind of variable lies where. The compiler will check to see that each module is declaring the same overall amount of space in each of the common subunits, but it won't prevent the programmer from trying to use ten bytes of storage as five integers in one module and as two reals in another.

Hayden's One-Way Road. Hayden's *Compiler* takes a somewhat different approach to memory allocation. In the default configuration the program is on the bottom of things, at decimal 2051. This block is followed first by variables and then by strings. The strings build upward from the top of the variable compartment toward a default himem of hex 9600.

In this default scheme, the compiler draws on a library of ready made subroutines, and includes them as needed within the program space. You have the option of bringing the entire 3.3K library into memory as a separate compartment, external to the program space. Presumably, this would be an efficient, space-saving thing to do only in cases where you were going to keep several compiled modules in memory at once to be called from an Applesoft program.

Variations from this default memory scheme are effected by means of an "active REM" statement, which must be the lowest numbered line in the source program. Allocating memory areas from within the source program rather than at compile time may seem like a little extra hassle, but it has the advantage of leaving you a convenient record of what you've done.

Hayden offers you the following allocation options: *B* specifies the starting address of the program; *X* summons and locates the optional external library; *L*, for lomem, specifies the beginning of the variable space; *S* declares the bottom end of the string pool; and *C* may underline the program space if you choose.

Separately compiled modules may share variables by declaring the same lomem. As with the Microsoft compiler, Hayden's global variables do not need to bear the same names. What matters is the order of declaration, and it's up to you, the programmer, to keep things straight. Since Hayden, unlike Microsoft, does not wall off a separate common variable block in memory, all the variables of at least one of the modules must be shared.

To avoid an implicit clear that would reinitialize shared variables, modules may be called at their starting address plus two. Hayden's manual recommends calling at the base address plus two, even if there are no variables in the called module, as a way of saving executing time.

At least two things are worth noting about Hayden's approach to string allocation. First, strings build upward toward himem rather than down and away from it. This wouldn't be possible with an interpreted Applesoft program because the variable space growing up from lomem is dynamically allocated. In a compiled program, all data spaces are static, so the compiler can set the low end of the string without fear of encroachment from the variables below. According to Hayden's manual, the upward building approach was chosen for two reasons: it lends speed to the concatenations and arithmetic string operations; and it permits the user to alter himem from within the source program.

The second, and perhaps more important, point about Hayden's strings is that no housecleaning takes place. If you want to compile a sizable program with a lot of string handling, you will need to sprinkle some FRE() statements into your source code, or you may find yourself out of memory.

A Moving Expedition. On-Line's *Expediter* arranges memory in the following manner: a 2K run-time library occupies the space from hex 800 to hex 1100. The library is not relocatable. However, it may be BSAVEd and BLOADed separately from the rest of your object code as a means of conserving disk space (the normal procedure saves the entire library with every compiled program). The program itself, in the default arrangement, rises out of hex 1100; any other address above 1100 may be selected instead. Variables, both local and global, work their way downward from himem, which defaults to hex 9600. Either group of variables can be located elsewhere in the user's options.

As with *TASC*, *Expediter* users declare global variables by means of active REM statements in the source program. The procedures are a little different, however. In *TASC*, all DEFCOMMON or USECOMMON statements have to appear at the front of the program, before any non-REM statements. In *Expediter*, the REM <G> and REM <L> commands act like switches and can be used at any point in the program. All variables following a REM <G> statement and before the next REM <L> are global variables; all variables following REM <L> are locals, and so on. As with other compilers, the programmer must keep track of the order in which global variables are referenced.

Strings in *Expediter* are handled in one of two ways. At compile time, users can specify either static strings, which are useful for passing variables between modules, or dynamic strings, which are much faster. When static strings are specified, the user dimensions them at compile time. The default value is 40. This figure can be overwritten globally, through a compile time option, or for individual strings by means of active REM statements in the source program.

Another option at compile time allows the user to protect up to ten areas of memory. This makes for an easy, space-efficient way to avoid clobbering the Hi-Res pages, shape tables, or whatever else you may want to protect. With this approach, you don't have to worry about relocating entire blocks of code; essentially, you simply tell the compiler how high and it will JMP.

SpeedStar Takes Extra Lap. The ability to jump over protected areas of memory is incorporated in *SpeedStar* by means of active REM statements in the source program. This approach, specifying the jumps from within the source, requires a first pass through the compiler to determine the appropriate places from which to jump.

Other user-selectable memory parameters in *SpeedStar* include the starting program address and lomem. As with Hayden's *Compiler*, *SpeedStar* users can share variables between separate modules by giving each module the same value for lomem and avoiding the implicit clear on calling various modules.

SpeedStar also allows you to specify an origin different from the starting address of the program. This might be useful if you were trying to compile a program above Hi-Res and had run out of memory, because *SpeedStar* itself occupies the space between hex 7200 and DOS. Using the origin option, you could compile the program at some lower base address, BSAVE it, and, with *SpeedStar* out of memory, BLOAD it back in at the true starting address. Large programs may be compiled to disk by using the memory-efficient segmented option of the compiler.

SpeedStar's run-time library, like *Expediter's*, is approximately 2K. Unlike *Expediter*, however, *SpeedStar* keeps the run-time library attached to the program. One future revision that *SpeedStar* programmers are still considering would allow the user to relocate the library away from the program code or to strip it out altogether and allow separate modules to share the same library.

In any event, the fact that the library does not sit immovably at hex 800, as does *Expediter's*, is important for *SpeedStar*, becuse this compiler has some features that facilitate the calling of compiled subroutines from within the co-resident Applesoft program. Having the library attached to a relocatable program code gives the user the option of making hex 800 available for a calling Applesoft program.

To facilitate the calling of compiled subroutines, *SpeedStar* includes a parameter feature that allows the transfer of values from the Applesoft program into the compiled subroutine. The compiler also supports the Applesoft USR command, which allows the transfer of data from the subroutine back into the calling program.

The parameter option is selected through an active REM statement. Another active REM command allows a subroutine to be called without any implicit garbage collection taking place. Yet another active REM command, when embedded within a subroutine, provides a message at compile time giving the calling address of that REM line. This would be useful for the compiled subroutine with multiple entry points.

Arithmetic Lesson. So much for matters of memory allocation and communication between program modules. There are some other important differences among the compilers.

Microsoft's *TASC* and Hayden's *Compiler*, for example, will perform true integer arithmetic upon integer variables. Here's how this works. Applesoft allows you to declare integer variables by adding the percent sign to the variable name. When the interpreter works with your integer variable, it first converts the value to a real and then performs its customary floating point arithmetic. So, actually, you slow down your program in effect by declaring integer variables, because the values have to be converted before becoming useful as operands. The only place where declaring integer variables appears to be advantageous is in large arrays: there the savings in memory space (two bytes per element instead of five) may offset the drag on computation.

TASC and the *Compiler* will perform integer arithmetic to the extent they can. The *Compiler* will treat all numeric variables as integers until it encounters a real quality or an operation requiring a real operand, at which time it will convert. *TASC* will treat as integers all variables declared as integer variables, and, rather than making you rewrite your source program to put in all those percent signs, it provides an active REM option that converts real variables into integer variables.

One of the limitations of Applesoft is its refusal to use integer variables as counters in FOR-NEXT loops. You can't even write FOR I% = 1 TO 10 without getting a syntax error. The REM! INTEGER feature in *TASC* allows you to overcome this restriction, and the *TASC* manual strongly urges you to use it, claiming that loops with integer counters may execute up to two times faster than loops with real counters.

It isn't clear from the manual whether Hayden's *Compiler* uses integer arithmetic for loop counters. But, judging from the results of our simple loop test (in which *TASC* aced out the usually faster Hayden compiler), it appears that it does not.

Obedience Is Perfect In None. Not every Applesoft command has been implemented by these compilers. In particular, since the compilation eliminates the need to have source code in memory, the commands DEL and LIST have been ignored by all four compilers. CONT was passed up by everyone but Hayden: all it does in deferred execution is hang up your computer; but if you want to put it in your source code, *Compiler* will compile it.

NEW, which seems like a candidate for exclusion, was implemented by all four compilers. In a compiled program, NEW clears out any Applesoft code that might have been lurking in memory, without affecting your object code or variables. Oddly enough, Hayden's *Compiler* requires you to terminate the source program with NEW, rather than with END. Your Apple may behave peculiarly if you don't.

Commands relating to cassette use (SAVE, LOAD, RECALL, STORE, and SHLOAD) have been almost universally ignored. The only exception is *Expediter*, which includes SHLOAD.

TRACE and NOTRACE were excluded from implementation by Microsoft and Hayden on the reasonable grounds that debugging should be done with the interpreter before the program is compiled.

Users of *Expediter* and *SpeedStar* have the option of enabling line tracing features, but at a considerable cost in code size and execution speed. The overhead of *Expediter's* line trace option is seven bytes per source line, in return for which you get error messages, stops, and CTRL-C breaks identified by program line number. You also get to TRACE in deferred execution. *SpeedStar* imposes a higher overhead. A numbers option, which tags your stops and error messages, costs eight bytes per source line. If you want to TRACE, you pay an additional three bytes per statement (not per line). On the other hand, *SpeedStar* allows you to select these features only for specific sections of a program, something not possible with *Expediter*.

The two compilers that did not implement TRACE and NOTRACE did implement RESUME. With *TASC*, there's an option available at compile time that will enable the compilation of RESUME; the price is three bytes for every source statement capable of generating an error. If the source program does not use ONERR GOTO statements and the RESUME option is selected, run-time errors will be reported, with line number, making this feature useful as a debugging tool.

With Hayden, the support of RESUME is automatic. If the compiler encounters a RESUME, it generates an additional three bytes for every statement in the source program. *SpeedStar* did not implement RESUME.

The Dimensions Of It All. Dimension statements are handled differently by all four compilers than by the Applesoft interpreter. All arrays are dimensioned statically, which means that DIMs with variable arguments will not compile, and only one dimension statement is permitted for a given array.

With Hayden and Microsoft, the latter constraint also applies to defined functions. These compilers will permit only one DEF FN statement per function name. *Expediter* and *SpeedStar*, on the other hand, treat DEF FNs exactly as they are treated by the interpreter.

One other interesting tidbit: *Expediter*, since it uses static string allocation and does not require the collection and disposal of garbage, has redefined the FRE token. FRE (X) in an *Expediter* source program will, on compilation, return the address of variable *X*.

Of the four compilers, Microsoft's *TASC* is the most disk-based. Each of three compiler passes has its own large binary file on disk, and there is constant I/O activity during the compilation process. As a result, TASC takes more time to compile a program than any of the others; a large program may take as long as twenty minutes.

During pass one, the compiler acknowledges active REM statements and displays each line of source code as it is processed. If any fatal errors are encountered, the compiler halts, displays the source line, and points to the offending syntax. At this point, you have the option to continue pass one to find any additional errors. Non-fatal errors — syntax that cannot be compiled, like an extra colon, or a statement following on the same line with a GOTO — get a beep and a warning.

After compilation, *TASC* displays the ranges of each memory block: library, program, local and global variables, and the compiled addresses of each source line. A CTRL-D PR#1 command at the start of compilation sends all of *TASC's* output to the printer.

The Race That SpeedStar Wins. At the other end of the spectrum, *SpeedStar*, in its default configuration, will compile even a relatively large file in a matter of seconds. That's because the compiler is entirely memory-bound, unless you specify otherwise. If you wish, *SpeedStar* will list your program as it goes, showing the compiled address of each line as it encounters it. Following the compilation, *SpeedStar* displays the address and length of two blocks: the program and library together, and the variables. Entering PR#1 before you load the source program will provide you with a permanent record of the compilation.

Hayden's *Compiler* does its work almost as quickly as *SpeedStar*, though it has to go to disk occasionally during the process. Curiously, though the compiler sends the screen a running account of its every activity, it doesn't provide a convenient way to record this output on paper. At the end of the compilation, your screen will show the addresses and lengths broken down as follows: literals, constants, main code, runtime modules, end of binary file, scalar space, array space, string pool, and initial himem. Questionable or faulty parameter specifications show up on this map in inverse video.

Expediter, like *SpeedStar*, will display or print a running list of source program lines and compiled addresses. The same list includes the locations of all variables as they are compiled, and the amount of source code remaining.

At the end of the compilation, statistics are displayed or printed: a symbol table; the start, end, and length of procedure, global data, and local data; the number of lines compiled; the number of variables; the number of data statments; the amount of temporary storage used by *Expediter*; and the number of forward references resolved during the compiler's final pass. The compiled code may be unreliable if the last figure exceeds 600. *Expediter* now has an option to pause on fatal errors; otherwise the compiler merely identifies them and moves on.

Conclusions. All of the compilers perform as advertised. For general use, and for programs involving heavy floating point calculations or integer variables only, our recommendation would be to try Microsoft's *TASC* compiler. While it's not the fastest compiler, it usually has the most compact object code, it is the easiest to use (especially when declaring local and global variables for chaining programs), and it comes with excellent documentation. Its only major drawback is that it compiles programs very slowly.

Both Einstein's *Expediter II* and Hayden's *Applesoft Compiler* produce slightly faster code for all but those programs using an extensive amount of integer math. *Expediter* excels in string manipulation. Yet they are both less convenient to use than *TASC*. They require much disk-swapping on one-drive systems, and in Hayden's case, requires a system boot before every compilation. Code expansion is normally more than double with both programs, although there is a memory compression option on the new *Expediter* that can produce object code only 1.5 times the length of the original Applesoft file. Large Applesoft files may or may not be a problem with either compiler.

SpeedStar, unfortunately, produces moderately slow compiled code. Large files will simply not compile, due to a large expansion of the object file. This is frequently true even when using the compile-to-disk option. *SpeedStar*, however, is very easy to use, and compiles faster than the rest. It has the advantage that it can reside in the Apple's memory in a transparent way, and can do its job in a matter of seconds. And yet only in rare cases would its advantages outweigh its disadvantages.

In sum, do not expect any Applesoft compiler to provide the best of both worlds. You sacrifice size for speed, or vice versa. They are helpful in programs that are marginally slow, but cannot help games that need to run in Real Time. For help in this area you will need to learn to program in Assembly Language.

NOTE: This Apple Compiler report is an update of an article that originally appeared in *Softalk Magazine* (September 1981). Reprinted with the kind permission of *Softalk Magazine*.

APPLESOFT COMPILERS

	APPLESOFT COMPILER	TASC	SPEEDSTAR	EXPEDITER II +
MANUFACTURER	Hayden	Microsoft	Southernwestern Data Systems	The Einstein Corp
PRICE	$175	$160	$135	$150
LANGUAGE	Machine Code	Compiled APPLESOFT	Machine Language	Machine Language
FORMAT	Two-16 sector disk	One-13 sector disk. Can be copied to 16 sector	One-16 sector disk: + hardware key, — plugs into paddle ports	One-16 sector disk
LICENSE TO USE COMPILED PROGRAM	Yes	Free	Yes	No
SPEED OF COMPILATION	Fast	Very Slow	Very Fast	Slow
SPEED OF PROGRAM	4-6 times	3-5 times	2-3 times	4-7 times
SIZE OF COMPILED PROGRAM (with runtime library)	2 + times	1.5 times	2.5 - 3.0 times	1.4 times
SIZE OF RUN-TIME LIBRARY	3.3K	4K	2K	2.3K
INTEGER OPTION	No	Yes	No	No
CHAIN PROGRAM	Yes	Yes	Yes	Yes
OVERLAY VARIABLES	Yes, but cumbersome	Yes, easy	Yes	Yes, easy
INTERFACE TO APPLESOFT PROGRAM	No	No	Yes, object code can be APPLE-SOFT subroutine	No
DOCUMENTATION	27 pages, 3-ring binder	97 pages, 2 ring binder	54 pages, 3 ring binder	30 pages, paper cover

SPEED & SIZE TESTS

	APPLESOFT	MICROSOFT TASC	TASC INTEGER	HAYDEN COMPILER	EINSTEIN EXPEDITER II +	SDS SPEEDSTAR
1000 PRIME NUMBERS	1	4.9	10.8	5.1	7.3	3.1
DEAL & EVALUATE 100 RANDOM POKER HANDS	1	3.2	—	3.8	3.7	2.5
MATRIX INVERT	1	3.0	4.6	4.9	5.0	2.6
SORT NUMBERS	1	3.5	8.1	4.8	5.0	2.4
STRING COMPARISON & SORT	1	3.6	7.9	5.0	5.5	2.3
KILOBAUD TEST INCLUDES INTEGER ARITHMATIC SUBROUTINE CALL AND COMPARISON	1	3.0	4.9	4.4	4.2	2.6
AVERAGE SHAPE OF A WAVEFORM	1	2.9	9.1	4.2	4.4	1.9
COMPILE LITTLE BRICKOUT INCLUDING RUNTIME LIBRARY	28 Sectors	39 Sectors	—	60 Sectors	48 Sectors	60 Sectors
COMPILE YAHTZEE INCLUDING RUNTIME LIBRARY	45	75 Sectors	—	100 Sectors	65 Sectors	unable to compile due to size

INTEGER BASIC COMPILER

Company: Synergistics
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $150.00
Availability: 2
Disk: Disk*

OVERALL RATING	**A**	DOCUMENTATION	**B–**	RELIABILITY	**A–**
EASE OF USE	**B+**	VISUAL APPEAL	**N/A**	USEFULNESS	**A–**
VENDOR SUPPORT	**B**	ERROR HANDLING	**A–**	VALUE FOR MONEY	**B+**

Galfo Systems has introduced an Integer Basic compiler that produces very fast and efficient machine code on the Apple II. While many may wonder why anyone would want to write code in as limited a language as Integer Basic, this compiler may provide the reason. First, the code is fast. Galfo claims seven to fifty times decrease in program execution time (consider ten times as a realistic average). Second, the code expansion is kept to a minimum; often it is less than twice the memory required for the Integer Basic Interpreter and can be closer to the same size if compiled under the least-memory-usage option rather than minimum speed. Third, this compiler has added many extensions that interpreted Integer Basic lacks. It supports Hi-Res graphics, strings longer than 255 characters, and the CHR$ function. Fourth, it allows you to overlay memory so that variables can share the same locations.

The compiler's processing procedure is fairly simple. It takes programs output from in the Integer Basic Interpreter as input, then checks for proper syntax, after which it compiles the codes into either one of two forms. Galfo has developed a stack-oriented code called GSL (Galfo Stack Language). It is much more efficient than Pascal's P-code. It optimizes program execution speed by employing data exchange procedures and manipulation of the 6502 stack. It also achieves enhanced speed by using special op-codes to handle common Basic statements and by incorporating an improved 16-bit arithmetic capability. Additionally, the computer's generation of mixed GSL and 6502 code is used for maximum speed. Mixed code is 20-50% faster than pure GSL code; however, pure code takes much less space.

Space problems are the usual bug-a-boo of most compilers. This one does require a run-time module that normally resides at location $8800 and is $E00 bytes long. The module can be relocated to any page boundary by a memory move. It is completely transparent to the user. The compiled Integer Basic program will load this module if it isn't already in memory; the compiled program can then be moved adjacent to the run-time module and saved together as one file. The compiled program can also be relocated at run-time. In addition, one can alter the setting of LOMEM. Normally, the compiler begins allocating memory at $800. One might want to establish allocated memory at a higher location if machine language routines reside in the bottom end of memory.

Speed is probably the prime consideration for using the compiler. While increased speed is often determined by program length and what functions are performed during arithmetic processing, it is safe to state that on the average a 10 times increase in speed can be realized. Obviously, long programs that have branches to line numbers and subroutines located near the end of the program would run faster than the stated average. We tested this assumption by performing several speed tests. The first one involved doing a factorial calculation with carry-over digits. The exponential/regression calculation, 50! (i.e., 50 x 49 x 48 . . .), expands into a series of descending-value cascade iterations (This algorithm involves numerous multiplications, divisions and additions.). Integer Basic took 47.2 seconds, the compiler 5.6 seconds. The source code occupied 675 bytes, the compiled code, 1258 bytes. When compiled for optimum space, it took 682 bytes and 5.9 seconds to execute. As a worst case, we compiled a Lo-Res program that output a random blue dot on the screen, tested to ensure that the space hadn't been used before, then output another one to the display until all 1600 dots filled the screen. We discovered that around 11,000 execution cycles were required. We inserted 1600 print statements for tracking the program's progress. The original program took 156 seconds, the compiled version 51 seconds. This is a paltry three times increase in speed; however, this result can be attributed to the extensive use of Integer ROM routines and 1600 print displays to the screen. The benchmark tests that the system supplies for a sample program produce results showing 10 times the throughput at maximum speed and 8 times that figure when optimized for space.

The compiler's extensions are quite nice. They use the DSP specification to access commands which are designated by keywords. For example, DSP HI turns on Hi-Res graphics. To draw a line from screen locations 10,12 to 260,140, one would write DSP LINE: PLOT 10,12:PLOT 260,140. Hi-Res shape tables are also supported, as well as the primary six colors. Other DSP functions are HOME, INVERT, FLASH, MIXED, LO, and H2. Additional functions are GET(0) and KEY(0) for detecting if a key has been pressed and which key it is. The CHR$ (0(expression), and extensive string manipulation with strings longer than 255 characters are also included in DSP's repertoire.

As to be expected, the program isn't the ultimate panacea for programmers. We've found that one can't chain compiled programs together because when the second program starts, it initializes the variables. The user should be aware that Integer Basic does not initialize variables to zero. This is a user responsibility because the compiler doesn't initialize them, either. However, it does manage to initialize non-array elements to zero.

The compiler resides on two protected disks. One is the system disk, the other contains the compiler, itself. The run-time module and several sample programs, (including one in Hi-Res) can be transferred easily. The documentation is very clear; it defines all functions of the Basic Integer Language and how the compiler handles them. While we were not impressed with any of the Applesoft compilers, we would whole-heartedly recommend this integer compiler.

LANGUAGES

INTRODUCTION TO FORTH

FORTH is a structured language that is ideally suited for systems and applications programming on a microprocessor system. Because FORTH is usually several times faster than BASIC interpreters, it provides considerable advantages for any application where execution speed is important, such as data acquisition, process control, animation, and video sames.

The basic element of the FORTH system is termed a "word," which is comparable to a subroutine or a function key on a calculator. To perform a function, you simply type the word. For example, typing BELL followed by a carriage return will ring the system bell. Before a word can be executed, it must have been defined in the FORTH "dictionary". The dictionary is a linked list of words containing each word's name and its actions.

Like many calculators, FORTH uses Reverse Polish Notation (RPN) and Last-In First-Out (LIFO) stacks to process arithmetic expressions and manipulate data. Therefore, arithmetic expression must be specified in RPN, with the arguments preceding the functions. For example, typing 2 3 + will leave a 5 on top of the stack. The + is the name of a word that adds the first two values on the stack and leaves the result on top of the stack.

Programming in FORTH consists of defining new words in terms of words already included in the dictionary. These new words can be tested and then used to define even more complex words until finally the most complex word becomes the application program. There are several ways to define new words and remove old words from the dictionary. The language even provides a facility for defining words whose function is to define words! This extensibility allows you to tailor the language to your own needs.

FORTH-79, VER. 2

Company: MicroMotion
Language: Assembly and FORTH
Hardware Requirements: 48K Apple II/II +
Department: Utilities
Sugg. Retail: $99.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	B+
EASE OF USE	B	VISUAL APPEAL	N/A	USEFULNESS	B
VENDOR SUPPORT	B+	ERROR HANDLING	A–	VALUE FOR MONEY	A

Forth-79 Version 2 is an upgrade of their original package. The most notable improvements have been the addition of Hi-Res graphics and floating point arithmetic. At this time, this is still the only version of FORTH for the Apple that conforms to the International FORTH-79 STANDARD. The FORTH dictionary comes with more than 400 words. It has 16 and 32-bit integer arithmetic operators, including +, –, /, /MOD, and MOD. The 32-bit integers can handle a range of –2,147,483,648 to 2,147,483,647, and can be printed in the dollars and cents format. You can create your own special data types with the words CREATE and DOES. There are string commands similar to Applesoft BASIC. Lo-Res graphics words are provided for plotting and line drawing. Memory is reserved for Hi-Res page one. There is an option package that includes Floating-Point Arithmetic and Hi-Res Turtlegraphics . The floating-point vocabulary uses the 32-bit format of the 9511 processor; and log, trig, and hyperbolic functions are included as well. Floating-point numbers can be displayed with a floating decimal or in scientific notation. The Turtlegraphics vocabulary is similar to the one in Apple Pascal. You can set up a VIEWPORT that clips any drawing outside a specific area. In addition to the normal color choices there are colors such as REVERSE, NONE, and WHITE1 and WHITE2, which allow you to draw true white vertical lines. There is no facility to output Hi-Res text.

The editor is a full screen editor with 27 editorial commands. Editing is done in the standard format of "screens" of 16 lines by 64 columns. The command keys and screen display are very similar to *PIE Writer* from Hayden, but can be redefined to correspond to the editor to which your are accustomed. There is a provision for lower case entry and 80-column cards.

A 6502 assembler with macro capability is included. The macros are created using the full facilities of FORTH for calculating, branching, looping, etc. The assembler uses numeric labels for branching and looping. Also, a structured approach is used with words like IF, ELSE, and THEN. The assembler is useful for writing small time critical-routines.

The operating system allows multiple disk drives. It is not compatible with the Apple DOS files, however. Disk access is quite fast. Disk is semi-locked; that is, it cannot be copied with the Apple COPYA program, but the "Grandfather" disk allows you to make as many working disks as you like.

All registered owners receive periodic mailings which contain errata notices, bug fixes, applications notes, and new product announcements. Overall, this is the best of the FORTH language implementations on the Apple.

TRANSFORTH II

Company: Insoft
Language: Assembly & Forth
Hardware Requirements: 48K Apple II + , DOS 3.3

Department: Languages
Sugg. Retail: $125.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	D–	DOCUMENTATION	D	RELIABILITY	D
EASE OF USE	F	VISUAL APPEAL	N/A	USEFULNESS	D
VENDOR SUPPORT	C	ERROR HANDLING	C	VALUE FOR MONEY	F

TRANSFORTH II states in the introduction that "Although there are some structural similarities, TRANSFORTH II differs from other available FORTH languages. Among the differences are that floating-point numbers and scientific functions are available, a sophisticated data structure and operating system are provided and the programs created with TRANSFORTH II are fully compiled for maximum speed". It is very true that it differs from the 79-Standard. Several non-standard word names are used. Therefore, TRANSFORTH programs will probably not run on other 79-Standard FORTH systems. There are no integer arithmetic operations; all math operations are performed in the floating-point format (Applesoft ROM routines are used). For many applications, this could slow things down. The data structures lack sophistication as compared to 79-Standard or "Fig-Forth". The words, CREATE (or BUILDS) and DOES are missing; thus, you are limited to CONSTANT, VARIABLE and ARRAY specifications. Apple DOS is used and there is no BLOCK option. A vocabulary structure is not supported; additionally, there is no assembler. All input and output is done in base 10. This is a JSR-type FORTH; that is, JSR machine code is used instead of an address interpreter. Their editor is very similar to BASIC. It has an AUTO line number command, but no search or search-and-replace commands.

The documentation states that an Apple II is needed, but this is only true if an Applesoft ROM card is installed. Insoft should have specified that an Apple II + is required. Also, the disk will not boot directly into Transforth if a language card is installed. There is no mention of how to handle this in the manual.

An attempt was made to run the BYTE Magazine benchmark (Sept. 81, pg. 190). Several modifications to the routines were required. Compiling them caused the system to crash without any error message.

TRANSFORTH II comes in a three-ring notebook with 53 pages of documentation. Of these, two pages are devoted to the introduction, eight consist of a tutorial on the language, six explain how to use the editor, eight apply to data structures, two pertain to data display and transfer, two describe floating-point number operations and display (including a list of error messages), three apply to high and low resolution graphics and three pages involve internal structures. There is also a four-page "annotated dictionary", which is more like a reference card than a full explanation of how each word is to be used, followed by a two page ASCII character chart with numeric equivalents. Finally, 11 pages of demo routines are included, along with a memory map.

This program appears to be a hybrid of FORTH, BASIC and an HP calculator, but most of the important features of each are missing, thereby limiting it's usefulness to the serious programmer.

FORTH DEVELOPMENT SYSTEM

Company: Information Unlimited Software
Language: Assembly & Forth
Hardware Requirements: 48K, Apple II or Apple II + , Disk

Department: Languages
Sugg. Retail: $140.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C+	DOCUMENTATION	A–	RELIABILITY	A–
EASE OF USE	C	VISUAL APPEAL	N/A	USEFULNESS	B
VENDOR SUPPORT	B–	ERROR HANDLING	D	VALUE FOR MONEY	B–

This adaptation of the FIG-FORTH 1978 model to the Apple II includes a screen-oriented editor and Bill Rassdale's 6502 built-in assembler with macro capability. Included is a well-written 131-page manual. Example screens are provided for Apple-specific functions such as Lo-Res graphics and tone generation. It is Hi-Res-compatible, but no plotting functions are supplied. It has 16-bit integer math, with double-precision math provided. There is no way to enter the important left-square bracket ("["), even though it is documented in the glossary. A handy FIG-FORTH reference card is included. The glossary is complete but difficult to use as a reference manual because there is no way to look up words by their function. Little information is given about the FORTH internals. There is a memory map. Apple DOS is not used and the disk access is quite fast. The disk is only 13-sector compatible and is not locked. While this FORTH has been available for over a year, there has been no on-going software support for the user in the form of enhanced software packages, newsletters, etc. There is a direct Hotline to the system developers. You may call for 15 minutes of free advice; after that the charge is $50 per hour.

FORTH II

Company: Softape
Language: Assembly & Forth
Hardware Requirements: 32K

Department: Languages
Sugg. Retail: $69.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	C	VISUAL APPEAL	N/A	USEFULNESS	B
VENDOR SUPPORT	C	ERROR HANDLING	B	VALUE FOR MONEY	B

Written prior to the FIG-FORTH 1978 model, SOFTAPE's FORTH is nevertheless a "true" FORTH in spirit and implementation. The manual is about 100 pages long, enclosed in a vinyl loose-leaf notebook, and is well written. Three demonstration games written in FORTH are included. There are some primitive strings and Lo-Res graphics words provided. The experienced FORTH programmer may encounter some confusion in adjusting to SOFTAPE's word names. For example, "; :" is used in place of "(BUILDS. . .DOES)". A line-oriented FORTH editor is provided. A built-in assembler is not provided. However, the manual gives an example of how to hand-patch machine code into a FORTH word with a facility for manipulating named sequential files. While this may seem to be an advantage to some users, it should be remembered that most FORTH systems expect to see mass storage divided into numbered blocks or screens. File systems and data base managers written by other FORTH vendors would probably not run in this FORTH version.

GraFORTH

Company: Insoft
Language: Machine
Hardware Requirements: 48K, 16K card recommended

Department: Utilities
Sugg. Retail: $75.00
Availability: 5
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	A
VENDOR SUPPORT	B	ERROR HANDLING	B	VALUE FOR MONEY	A–

GraFORTH is a powerful language for working with both two and three dimensional graphics. As a variant of the language FORTH, it is extremly fast, about half to a third as fast as machine language. Although *GraFORTH* compromises the language by exploiting the unique characteristics of the Apple, and by using standard DOS text files for source files, it is indeed a very powerful version and relatively simple to learn by non-FORTH users. It's use of "words" as part of the language, and the ability to create new "words" allows the user to customize *GraFORTH* to suit his needs. As a dialect of FORTH, it lacks BLOCK, DOES, VOCABULARY, IMMEDIATE, and some other features of regular FORTH.

The package comes with an extensive and well written 220 page user manual. The author, in an attempt to make the language user friendly, allows you immediately to begin typing commands that draw on the screen. There is also a program called PLAY that allows the user to take a three dimensional object and rotate it, reposition it, or scale it on any one of its three axes. There is a very commendable attempt to involve first time users rather than scare them off. There are even a number of impressive demos to show the capabilities of this package.

The usual method of entering programs is through a line editor. There are two versions of this editor, one for regular machines and one for 16K cards. The regular version allows storage of 2000 bytes of source code (50-100 lines). With 64K you can write a source file of 11,500 bytes. The line editor is somewhat similar to the BASIC editor but allows the insertion of characters within the line. There is also a renumber feature for these numbered lines. The editor is clumsy, so many users may prefer to use a word processor to edit these standard text files. Then, after these source files are written, they are compiled.

The two-dimensional graphics are similar to Applesoft Hi-Res, and have the following enhancement: colored diagonal lines are never broken in color. You can examine any of the Hi-Res screen's 49,152 points. There is a color fill mode, and you can either draw in the Or or EOR modes. All commands are by word: e.g. 50 25 PLOT 100 100 LINE will draw a line from 50,25 to 100,100. The language also supports Turtlegraphics as used in the LOGO language. It supports the MOVE, TURNTO, TURN, and MOVETO commands. Although you can specify any of 360 angles, the calculation actually supports only 256 different angles.

The language also supports character graphics; and, in normal text, supports lower case. There is even an editor for modifying character sets. These characters can be printed in any size and any color. These redefined characters or text characters can be mixed on screen with any two dimensional drawing.

Perhaps the best use of the language is for drawing and manipulating three-dimensional objects. This means that after defining shapes with an interactive image editor, they can be rotated, translated, positioned, scaled, and put in color. The image editor, while powerful, does not allow insertion or deletion of points except the one last worked on.

The user can use up to 16 shapes within a program. The objects can be manipulated by program or keyboard control. Although *GraFORTH* does not support paddle inputs, there is no reason why one cannot do a CALL to a user-defined machine language routine that will read the paddle. There is even a reference to such a routine on pages *5-31*. One of the unique features of this language is the ability to retain perspective control in a three-dimensional shape. There is a scale factor in the Z axis that allows the user to adjust the perspective to his liking.

GraFORTH has many uses but the most suitable is for 3-D arcade game design. The software can be incorporated into one's commercial product at no cost: only written permission is required. The package is not copy protected and is clearly documented so that it doesn't interfere with your code. I should mention that the package also includes a very fine music editor for including music in your programs. In summary, this package is one of the most powerful and user friendly packages on the market. Its ability to produce compiled, FORTH-like code that is nearly as fast as machine language makes this product very worthwhile as a development tool.

MATHEMATICS & SCIENCE

DESK CALCULATOR II

Company: Telephone Software Connection
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $30.00
Availability: 1
Disk or Tape: Telephone Transfer (Disk)

OVERALL RATING	A	EASE OF USE	A	ERROR HANDLING	A
EDUCATIONAL VALUE	N/A	DOCUMENTATION	B–	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	B+	VALUE FOR MONEY	A

This is the most comprehensive calculator program available. It literally turns your Apple into a pocket calculator that has functions ranging from trigonometry and statistics to metric-decimal and hexadecimal-decimal conversions.

The display is a graphics representation of a large pocket calculator. The left hand side is the main calculator with alphanumerical display at the top. The right hand side shows 10 memories and 12 keys that can be redefined by the right arrow key.

These keys include statistics — both one and two dimensional arrays, factorials, permutations and combinations; rectangular to polar conversions; degrees to radians; trigometric, hyperbolic and logarithmic functions. There is also a comprehensive series of metric-English conversions and for computer programmers decimal to hexadecimal conversions and the display of the HI and LO bytes of the address. The program allows user-defined functions and during normal calculations allows the use of parentheses for evaluating simple expansions like 6*(3 + 4) = . If a print-out of the calculations is needed, the printer can be toggled from within the program.

The program is completely self-documented. It has an excellent error checking routine that will indicate an error in the display for impossible calculations.

WHIZKIT

Company: P.V. Systems
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	F	EASE OF USE	F	ERROR HANDLING	F
EDUCATIONAL VALUE	D	DOCUMENTATION	C+	RELIABILITY	F
VENDOR SUPPORT	C	VISUAL APPEAL	D	VALUE FOR MONEY	F

WHIZKIT is a program looking for someone who thinks he needs it; if he does, he probably won't use it. The program changes a variety of numeric and scientific values or units from one system to another, using an apparent superfluous degree of exponential notation. Most engineers will find that a conversion handbook is easier and faster to use for the rare occasion requiring changing a single value; a simple calculator program would also be easier to use for the even less seldom need for converting a number of sets of values to a different system.

The program requires extensively studying the well-done documentation to learn the non-standard vocabulary of unit names, plus trial and error usage of the program itself for fully understanding the rigid format and data inputs. Failure to enter the input correctly results in bombing the program due to inadequate error trapping. More seriously, there are errors in the system which just are not acceptable for a scientific program; typographical problems in both the menu and the instructions shake the user's confidence. As an example, factor of 1000 used in converting millimeters to centimeters (and vice versa) is unconscionable!

If you don't have a handbook or simply enjoy curiosity programs, WHIZKIT is fine. This is provided that you are willing to find and fix the known errors, and validate the accuracy of all functions that you might anticipate using.

STAT TRAK

Company: Quality Software
Language: Applesoft
Hardware Requirements: 32K & Disk (Printer desirable)

Department: Education
Sugg. Retail: $49.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	C	ERROR HANDLING	B
EDUCATIONAL VALUE	C	DOCUMENTATION	D	RELIABILITY	B
VENDOR SUPPORT	B–	VISUAL APPEAL	C+	VALUE FOR MONEY	B

STAT TRAK is a significant achievement in applying a home computer to a complex engineering problem normally requiring large computer systems. The program will calculate the orbital path of a spacecraft, displaying it either in an excellently-formatted table or on a well-done black and white Hi-Res world map. A second program tabulates the azimuth and elevation angles for a given satellite based on the observation time, location and altitude of a "bird watcher". There are also two easy-to-use routines to periodically update the ephemeris data of any of the satellites supplied in a master file or to add a new satellite, using mean orbital parameters easily obtainable from NASA.

The specified accuracy of plus or minus two degrees was tested, using the inputs to and outputs from a VAX 11/780 computer as a "zero-error" standard. The absolute error was slightly less than one degree, which is an excellent achievement, great for visual detection and tracking, and much more than required for radio hams (at most frequencies). With that degree of error, a 45x telescope should be able to locate and detect a low orbit satellite; however, optical tracking or effective use of higher magnification eyepieces is another matter.

The program is voluminously documented and, after some initial experimentation, is very easy to use, but both the programs and the documentation suffer from shortcomings in omission and commission. Saving and storing of the observer's position for subsequent recall would simplify operation and permit computation of GMT and Julian dates by the Apple – a simple enough task which would endear STAT TRAK to the non-engineer Apple owners. The avoidance of the use of color in the graphics is presumably a carry-over from the "TRS-80" and "Sorcerer" versions, but for the $45.00 price tag, these minor "customizing" improvements seem to be a reasonable expectation.

The documentation's shortcomings are more diverse in nature, but for the most part stem from expecting a single set of instructions to satisfy all cases for the Apple, "TRS-80" and "Sorcerer". The documentation is intended to cover both disk and cassette versions to boot. The test cases are fine, but don't expect to match up your display data formats with those in the documentation that show a 60-character line. Additionally, there is the matter of typos – easy to spot in the context of a sentence, but not in an example input! To complicate matters, using typo examples *should* result in an "Error-on-Input" message; however, this doesn't happen because the program will use default values and produce an ephemeris with which you might happily run off with for a night of astral watching – and watching – and watching. (Does this connote the fact that the error message may cause problems?) Conflictingly stated hardware requirements, and inconsistently named and misnamed programs further confuse the situation, although the detail in many areas is superlative in its step-by-step clarity.

In total, however, STAT TRAK, while it could use some updating, does what it claims to, does it with a minimum of operator fuss, and is a good venture into higher technology for the home computer enthusiast. If you have ever had a hankering to see a Russian satellite, STAT TRAK makes it a cinch, albeit at a significant, but specified distance away!

TK! SOLVER

Company: Software Arts, Inc.
Language: Machine language
Hardware Requirements: 48K

Department: Business
Sugg. Retail: $299.00
Availability: 4
Disk or Tape: Disk*

We received a preliminary copy of *TK! Solver* too late before going to press to permit a thorough review. Nevertheless, considering the fact that this program's authors are the same who wrote *VisiCalc* (reviewed elsewhere in *The Book*), we felt that the program should at least be mentioned here though not graded.

Stated very simply, *TK! Solver* computes equations. You enter the equation and the known variables, then have the program solve the problem. Without having had the opportunity to fully test the program, it appears to be a potentially useful especially for those in the fields of engineering, science, teaching, mathematics, or other fields in which an electronic calculator capable of solving complex algebraic equations would be of benefit.

We anticipate that a complete review of this program will appear in our next supplemental issue of *The Book*.

MATHEMAGIC

Company: International Software Marketing
Language: Applesoft
Hardware Requirements: 48K, 1 Drive, Applesoft in ROM, Printer Optional

Department: Education
Sugg. Retail: $89.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
EDUCATIONAL VALUE	B	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	B	VISUAL APPEAL	A	VALUE FOR MONEY	B+

MatheMagic is just what everybody claims to want — a way to turn the Apple into a super calculator. The program allows you to create free form expressions (equations) which are up to 240 characters in length using standard math symbols and conventions. It allows you to pre-define variables, or have the system ask for a value each time the expression is calculated. The program contains pre-defined functions for trig and log conversions. It also supports base conversions (i.e. hex to decimal, decimal to hex).

When calculating an expression, you can request that each calculation that the system performs in solving the problem be shown; or you can let it run quickly to completion. You can change variables, or change the expression itself, allowing you to do a certain amount of "what if" evaluation.

You can store equations and/or variables to disk for later use. The program has the ability to pass or receive information from outside programs or data.

The display is well laid out on the screen, providing you with a menu for the operations currently being performed and a display of the current expression, as well as a "workspace" where the actual calculations are performed.

The program is easy to use because it includes several help displays which can be activated at any time during the program's operation. The documentation is reasonably complete, and includes a set of sample application and technique guides useful in learning the program.

All in all, this reviewer feels that *MatheMagic* has potential in two areas: first, for those who wish to have a sophisticated calculator-like program; but, more importantly for the student, to have the step-by-step evaluation method available, enabling him to see how a problem is solved — extremely valuable in the learning process. An additional feature that is supported in this mode (step-by-step) is the printing of these steps on the printer for later review.

In summary, as educational programs go, this is an excellent package. It seems to be well written, reliable, and, does what it claims to do.

MULTIPLE REGRESSION

Company: System Design Lab
Language: Applesoft
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $39.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C	DOCUMENTATION	C–	RELIABILITY	C–
EASE OF USE	C–	VISUAL APPEAL	C	USEFULNESS	B–
VENDOR SUPPORT	B–	ERROR HANDLING	A–	VALUE FOR MONEY	C+

MULTIPLE REGRESSION is a statistical program used for multi-purpose predictions. The program may be used in business, education or in any field where empirical data is used to predict future events. The program includes the correlation matrix, inverted matrix, the sum, mean and standard deviation, and optional hardcopy printout.

The package appears to be designed for those conversant with and knowledgeable about statistics. As such, the program does a good job. It would be desirable, we believe, to expend more effort in making it more useable and understandable for the average layman.

COMMUNICATIONS

SOURCE

Company: Source Telecomputing Corporation
Language: N/A
Hardware Requirements: Apple II/II + with modem and terminal program. Printer helpful.

Department: Business
Sugg. Retail: $100.00
Availability: 5
Disk or Tape: N/A

OVERALL RATING	B –	DOCUMENTATION	A	RELIABILITY	B
EASE OF USE	C	VALUE FOR MONEY	B	ERROR HANDLING	B –
VENDOR SUPPORT	B	VISUAL APPEAL	C		

The *Source* is a timesharing system, rather than a specific program, for the Apple computer. With this system, the user has access to a large number of programs and databases housed in several mainframe computers located in Virginia. The $100 price noted above is the signup charge. In addition to this, there are hourly charges which vary by time of day and baud rate used. Both 300 and 1,200 baud are available through the local TYMNET or TELENET data network. The *Source* is a subsidiary of The Reader's Digest Association, Inc.

There are many features of the *Source*. These include several modes of communication: electronic mail, chat (realtime conversations), post (a public bulletin board), voicegrams, and mailgrams. The information services include: *Source *Plus* (added cost features), business databases, shopping by catalog, education and careers, government and politics, home and leisure, news and sports, science and technology, and, finally, travel, dining, and entertainment.

The *Source *Plus* features *Media General*, a way of obtaining historical and current performance comparisons for common stocks. The commodity *News Service* tracks activity in the major future markets. Management Contents, Ltd. makes abstracts available from 27 business publications. *Comp-U-Star* is a discount catalog electronic shopping center. The *Legi-Slate* system, a legal information service, was to be added; but they are presently having problems with that database and so it was recently dropped from *Source *Plus*.

With the business programs you are able to access current stock information and create portfolios that may be kept up to date on a daily basis. In addition to those functions available through *Source *Plus*, the *Unistox* database of UPI is available. Command files will access this database automatically. For general information, the *Source* accesses the UPI business news and obtains opinions from Raylux Financial Services.In addition to the *Comp-U-Star* database, you are able to use the *Source* to barter, order records and tapes, order books, and get tapes of classic radio programs. There are educational programs ranging from simple counting drills to sophisticated computations in math and science. Methods of obtaining college financial aid are on the *Source* for callup. Finally, for employers to access, there is a database of resumes of people looking for work. You can keep track of the government on a daily basis through many of the UPI entries. If you wish, you may even set your computer up as a teletype and get a running UPI newswire on your desk (of course, computer hookup costs will be running!). Further, many games may be played through the *Source*. There is also a home medical guide where you respond to a variety of general questions and the computer returns descriptions of various ailments. Should you be interested in travelling, the *Source* can help you plan your trip. Both international and domestic air schedules are in the system. When you have your trip set up, there is a travel club through which you make your reservations and get the tickets via regular mail. Once at your destination, use the *Source* to find a good restaurant or learn about what local wine to order. For after dinner entertainment, you may consult the *Source* for the latest movie reviews. If you are interested in doing something out of the ordinary, the *Source* allows you to create your own files and programs in several languages. Text editing may also be performed, with very professional results. Some users offer other services, such as typesetting, so using the *Source* you can write, edit, check for spelling, and then transmit to a typesetter. You will be returned a camera ready copy of your work. The *Source* also encourages public use of the system for information exchange. To that end, they have set up a public area where users establish "magazines." As other users read the material, the original publisher is credited with a royalty from the reader's usage fee. The *Source* is now experimenting with a computer conferencing capability termed *PARTICIPATE*. It is only now in the experimental stage, but promises to provide users with common interests a forum for conferencing and exchanging ideas. As of this writing, the *Source* has over 20,000 users. Using the old operating system, this was starting to result in rather slow response times. At the end of 1982, the *Source* will be moving its computers and will begin to use a new operating system which is supposed to greatly reduce the user response time. Instead of using each computer by itself, they will all be tied together as a unit. Time will tell if this will be successful.

ASCII EXPRESS II

Company: Southwestern Data Systems
Language: Applesoft & Assembly
Hardware Requirements: 48K; Micromodem or communication card & acoustic coupler

Department: Utilities
Sugg. Retail: $49.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	A–	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B+	USEFULNESS	A
VENDOR SUPPORT	B+	ERROR HANDLING	A	VALUE FOR MONEY	A

THE ASCII EXPRESS II is a complete package to upload, download and edit files for all data types associated with many types of computers — both personal and mainframe. A line-oriented editor is included, as well as a system of terminal-oriented keyboard MACROS and an index system to help keep track of system phone numbers and automatically accessing associated MACROS.

Upon booting the program, the user must perform a two-step configuration procedure. The first step is done by a configuration program, the second step by editing one line in the main driver program. The manual has a detailed explanation of the parameters which makes this task relatively easy.

The terminal software is primarily designed to be used with the Micromodem by Hayes Computer Company (formerly D.C. Hayes), but the program works well with the communication card and acoustic coupler. Features used with the Micromodem include: auto-answering of the phone, dialing up a system (a MACRO can be used to dial a pre-stored phone number), hanging up the phone and a system check to make sure there is a continuous connection.

The file retrieval system consists of routines to upload, download and edit files. In sending a file to another system, options are provided for transmitting it (line by line or character by character) and whether to look for a prompt character or not. In receiving a file, the system operates in slave or master mode (master is used most often), sends system commands to other systems to control their dump, and asks if an append to existing buffer file is desired.

The editor is a line-oriented version with limited character replacement ability, although adequate for this application. The editor is a separate program that is chained into memory when needed and then re-chained back to the terminal program when no longer needed.

Files are stored in a memory buffer until they are saved to disk. Files can also be loaded back into the memory buffer from which they can be transfered. This buffer is fairly large. During our evaluation, we downloaded a 20K file; however, caution must be taken since the program does not inform you when the buffer is full, possibly resulting in data being lost.

There are additional programs included with the package that will allow the user to send and receive Apple binary files, Integer and Applesoft programs in addition to the text files.

The disk is protected but contains a limited copy program which allows four back-up copies to be made.

In our evaluation, we found it impossible to really bomb the program even though one can obtain strange results. In spite of this, everything we encountered was easily recoverable. This is one of the best terminal programs available. We used it to communicate between the following systems with no difficulties (we used both the Micromodem and the communication-coupler combination):

Apple to two different CDC timeshare systems
Apple to a PDP 11/70
Apple to Cromemco. (280/CPM)

ASCII EXPRESS "THE PROFESSIONAL"

Company: Southwestern Data Systems
Language: Machine
Hardware Requirements: 48K; micromodem or communication card & acoustic coupler

Department: Utilities
Sugg. Retail: $129.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	D	RELIABILITY	C
EASE OF USE	D	VISUAL APPEAL	C	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B

Strange how a communications package of such power and scope can fail so miserably in its documentation. It would seem that experts in communications would see the necessity of providing clear, precise, step-by-step documentation. This is not the case with *ASCII Express, "The Professional,"* or *ASCII PRO* as it is called in the computer stores. No doubt the authors believed that they were providing an easy to follow manual. At least their manual does have tabs to help the user find his or her way around. However, the tabs are actually useless until one has already mastered the program; at which point a manual is no longer necessary. But, the poor documentation

aside, *AE PRO* is a well written and well conceived program of comprehensive magnitude. It can be an extremely useful tool once it is understood.

Upon first boot of three copies of this program this reviewer found himself "dumped into binary," which effectively means the program failed to run at all. The instructions in the manual indicated a text file was acting as a boot-up program. For some reason, my Apple failed to boot my copies. I was forced to write a simple, basic boot-up program to make *AE PRO* work for me; something the novice computer owner might have trouble with. Perhaps this problem will soon be cleared up, but it would be a good idea for the buyer to test his copy in the store before taking it home.

AE PRO does support a full range of 80-column boards, modems, and printer interfaces. In some cases, special features of individual modems can be made active simply by installing them in the hardware start-up section. *AE PRO* has a built in memory management system which will relocate DOS into a 16k card, if one happens to be in the machine, increasing the buffer size by 10k. This feature is extremely helpful. The program will also allow one to "Auto Save" a program larger than the memory of the Apple by saving the data in sections with extensions to the main file name. This effectively gives the user a limit of information retrieval equal to the size of the disk storage space.

AE PRO has its own modest capacity text editor. This can prove useful at times when it is either impossible or inconvenient to use your word processor program. It is a functional text editor with insert, delete, and other basic features. Though not as powerful as a good word processor, it is handy.

In addition, *AE PRO* features Macros and a number file. These can be set up to make dialing and sign-on procedures automatic. Here again, a more intelligible manual would have been helpful. This reviewer has used *ASCII EXPRESS*, the predecessor to *AE PRO*, and was still baffled for quite sometime in figuring out how to load and save the Macro Library.

Perhaps the reason *AE PRO* was so frustrating to begin with is the fact that it is a very powerful yet flexible program with simply too much information to be covered in a single manual. It is definitely one of the most comprehensive pieces of communication software on the market. However, the user must be a communications professional with expert knowledge of that field in order to fully utilize the full power of *ASCII EXPRESS*, *"The Professional."*

Z-TERM

Company: Southwestern Data Systems
Language: 8080 Assembly Language
Hardware Requirements: 48K, 1 Drive Z80 Card, Micromodem or Equavalent Modem Communication Hardware (16K Card Optional)

Department: Utilities
Sugg. Retail: $99.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	A	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	A–	VISUAL APPEAL	B	USEFULNESS	B+
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B+

Z-Term is another outstanding, simple-to-use communications package from Bill Blue. The main purpose of this program is to communicate via modem with other computers whether they are micros, minis or main frames. *Z-Term* provides several useful functions such as facilities to upload and download files, and pre-defined macros and terminal emulators. It also supports 80-column boards.

Z-Term is capable of receiving a file (download) up to 36K in length with no outside intervention. For files that are greater than 36K, you are instructed how to transfer your information in 36K blocks. While receiving a file you are also given the option to print what you are receiving as it is being received. In transmitting a file (upload) the file size is limited by the diskette. In this function four modes of transmission are supported: variable speed data flow, variable delay after carriage return, adjustable handshake, and adjustable character flow.

The macro capability allows you to define character strings that can be used to dial the phone (for Hayes-type modems), to log-on to another system, or to send special protocol/log-on information.

The terminal emulation section allows you to set up *Z-Term* so that your Apple appears to the host system as a specific terminal (i.e. DEC VT52). This is very useful in communicating with certain computer systems in which clear screen and cursor position codes are sent back to the Apple.

This program is menu driven but requires some set up, depending on your hardware configuration. If you are not using a Micromodem, the system starts in a terminal mode and you must enter a command to get to the menu. But with a Micromodem the system "knows" the command and starts with the menu.

The program is relatively easy to use and the documentation explains the commands well, so that the average user should have no difficulty in communicating with other computers. All that's required is the phone number and access codes to the computer you want to talk to. If you are looking for a good, low cost terminal communications package, then *Z-Term* may be the answer.

Z-TERM "The Professional"

Company: Southwestern Data Systems
Language: 8080, Z80 & 6502 Assembly Language
Hardware Requirements: 48K, 1 Drive, Z80 Card, Micromodem or Equivalent Communication Hardware

Department: Utilities
Sugg. Retail: $149.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	C–

Z-Term "The Professional" (nicknamed Z-Pro) is an expanded, enhanced (although the authors claim not an updated) version of Bill Blue's program *Z-Term*. It supports all the functions of *Z-Term* (see review elsewhere in *The Book*) plus numerous special features, such as auto answer and unattended file transfer when used with Novation's Auto CAT or the Hayes Micromodem.

The major enhancement is in the area of file transfers. Not only can this package handle a wider selection of file types, it seems to do it more effectively. The claim is that it will handle file transfers at 1200 BAUD, but I was unable to verify this due to lack of equipment.

Z-Pro supports both the Christensen and Pan transfer protocols, which gives the CP/M user a great flexibility in file transfer between other CP/M systems such as Bulletin Board. But I felt that a very important protocol, XON/XOFF, was left out. This protocol is supported by many minis and mainframe time-share systems as well as the IBM PC Asynchonous Communication package, and I believe there is a great need for a program supporting this protocol.

Another improvement over *Z-Term* lies in the area of printing what you are receiving. A problem that apparently exists in *Z-Term* is that characters can be lost when the printer is turned on. Supposedly, this flaw has been corrected in Z-Pro (but let me note that I've experienced no problems in printing a file with either program).

One clever feature, although I cannot comment on its usefulness, is the "CHAT" option: this allows the operators on both ends to "talk" to one another by typing back and forth, presumably to facilitate file transfer.

One clever feature, although I cannot comment on its usefulness, is the "CHAT" option: this allows the operators on both ends to "talk" to one another by typing back and forth, presumably to facilitate file transfer.

The documentation for Z-Pro is well laid out, bound in a tabbed 3-ring notebook. I found the sections containing the explanations of protocol and programming considerations interesting and very worthwhile.

My major disappointment was that, in order to protect this program from software piracy, Southwestern Data Systems felt it necessary to include a hardware "key" that is inserted into the game I/O socket. This method does allow you to make as many copies of the diskette as you want, but requires that the "key" be in place in order for the program to function. In order for the "key" to work properly it had to be inserted in the socket on the motherboard, not in an expanda-port socket. This means that if you have another program requiring a different "key" you would have to continually switch a fairly fragile piece of hardware (the pins can easily be bent) before you can run your programs. In itself "the key" is enough to keep me from purchasing the program. *Z-Term* is adequate for my purposes, and I use it on a regular basis.

In summary, I feel that although this is a professionally written and presented package, the extra features do not rate the increased price and increased security. But for those who require a little more sophisticated package than *Z-Term*, or require the special communications protocols, this is your package.

AUTOTERM

Company: Softworks, Inc.
Language: Applesoft and Machine Code
Hardware Requirements: Apple II/II +, Hayes Micromodem; printer optional

Department: Utilities
Sugg. Retail: $59.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	C+	DOCUMENTATION	B–	RELIABILITY	C
EASE OF USE	B–	VISUAL APPEAL	N/A	USEFULNESS	C
VENDOR SUPPORT	C	ERROR HANDLING	C	VALUE FOR MONEY	C

This is yet another of a group of terminal and communications programs that are making their way to the market. As a group, these programs generally boast of being able to accomplish many of the same things. The documentation for this package is no exception. Unfortunately, the program falls somewhat short of the user's expectations and is not a real match for some of its more sophisticated, less expensive cousins.

The initial problem encountered in this system is the lack of Applesoft on the boot disk. The language and 16K card users must first do a boot of the system master to load the card and then find and run the DOS greeting program on the disk. There have been several published programs that check the language card and load it, then proceed to call the greeting program and run it upon boot. A truly user friendly program would have one of these on the disk with instructions for the owner to delete it if not needed.

AUTOTERM is an upper case only program. It is ABBS-oriented, but will work with other systems. The program has an auto-dial feature for up to 25 systems. Auto-logon is also supported (according to the manual). Although the manual stated as such, this reviewer could not get the feature to work with either an HP3000 or DEC20/20 computer. Manual-logon and other features of the program worked fine, but the auto-logon did not.

The program has an auto-capture mode with a 20K buffer. You are given warning when about 19K has been filled. When the buffer is completely full, it begins to wrap around and fill again from the beginning. AUTOTERM avoids the Applesoft garbage collection option by treating the incoming information as individual bytes which are stored sequentially in memory and handled as one long binary file. When this buffer is saved, it is generally saved as a binary file, although you have the option of converting it to a text file.

AUTOTERM is programmed to support the Centronics 730 printer with the Apple Centronics Interface Card. Other printers may require modification to part of the program (specified in the instructions).

There is an editor function with AUTOTERM. The function is a rather simple line-oriented text editor with a 600 line limit on the file size. Each line may be a maximum of 80 characters long.

AUTOTERM will set up the Micromodem card in its remote terminal configuration so you may receive calls from other Apple computers and have programs (as text files) loaded into your machine.

No backup copies are provided, but the program disk may be copied for backup purposes by the Apple Copy Program on the System Master disk.

DATA CAPTURE 3.0

Company: Southeastern Software
Language: Applesoft & Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	B+
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	B+	VALUE FOR MONEY	B

The DATA CAPTURE 3.0 program is a useful addition to any programmer's library when that person has to communicate with other computers and save the data. As advertised, the program will capture all text coming from the other computer (at least until memory is full). Saved text can then be stored to disk for later manipulation.

The major problem with this program involves the timing between sending a command and the start of receiving data: screen formatting takes place while data is being transmitted; during a test run, the first 17 characters (or so) from the other computer were not captured. In addition, the last two letters of the transmitted command appeared in the first line of captured data. The first part of the problem appears to be a programming anomaly; the second appears to be a characteristic of the D.C. Hayes Micromodem. The last two letters of the command are repeated when programs are written for the Micromodem, too. A simple textual fix, of course, is to make certain that the first line of text to be captured is not needed; thus it can be later deleted before saving the file. A program logic fix would involve formatting the screen before sending the last command and finding some way of getting rid of the Micromodem problem.

The input routine of the program is very efficient and follows the data to be sent exactly at the fastest rates this reviewer could push it. The same input routine appears to be used for both modem and disk entry, so the clever programmer could probably extract it and use it for a text entry routine to avoid the Applesoft garbage collection problem found in many editors. Garbage collection only takes place when memory is almost full.

Because the program manipulates text files (reads them, merges them, and saves them) and since all characters are supported, the program can be used in everyday use to transfer text files from one disk to another rather rapidly. The only warning is that you must rename the file you want to copy with a "TXT" suffix since the read routine expects to find that designated suffix. With clever use of the read, delete, merge, and save capabilities, the program itself could be made to function as a crude editor (although that obviously is not its purpose).

VISITERM

Department: Utilities
Company: Visicorp
Sugg. Retail: $149.95
Language: Machine
Availability: 7
Hardware Requirements: Apple II or II + and modem. Supports printer.
Disk or Tape: Disk*

OVERALL RATING	B –	DOCUMENTATION	B +	RELIABILITY	B
EASE OF USE	B –	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	A	ERROR HANDLING	B +	VALUE FOR MONEY	B

VISITERM is Personal Software's entry into the communications area. The program uses the Hi-Res screen for display of both upper and lower case letters plus special character sets like that associated with APL or any others you might want to create. All of the standard communication cards are supported and the program is flexible enough so that it should support future cards.

Like all programs on the market recently, VISITERM supports sending and receiving text files. The internal buffer limit is 18,000 characters or anything smaller that you specify. There are provisions for disk operations which will allow sending and receiving larger files.

Connection is established in standard ways through an acoustic coupler or via direct dial if you have the Hayes Micromodem. There are no provisions for automatic dialing from stored numbers if you have the Micromodem.

The program is driven by various escape sequences. Prompting for all of these would fill the screen so it is advisable keep the quick reference card handy until you memorize the ones you use most. A status line is provided at the bottom of the screen and all commands entered are reflected there as a double check for you.

The long "break" signal required by many timesharing systems is supported and you have the capability of changing the length of the signal.

One strength and weakness of the VISITERM program is its options section. This is a strength because of the large number of options available and a weakness because the large number of options requires the users to really know what they are doing if anything other than the defaults are picked.

Some of the features available are listed here:

1) Change data format and communications speeds.
2) Create and use keyboard macros.
3) Adjust and use protocol characters and auto-acknowledge characters for block data transfer.
4) Vary character appearance and switch character sets.
5) Completely change the screen characteristics, scrolling, etc. for viewing suitable to you.

For all of these operations you may save them to disk for later use. You should save the options you find useful rather than changing them every time. The default mode for the operation is half-duplex. Every time you change options you are sent back into the half-duplex mode and you must change it if it is not saved. For full-duplex users like this reviewer, this can be a pain if many options are used (like when the program was being reviewed).

Since the Hi-Res screen is used for character display, any character set you want may be used. Several sets are provided; for the adventurous, there is a character editor within VISITERM. With it, you could create a graphics character set, transmit it to a friend; with an Apple and use VISITERM to trade pictures.

It would be wise to learn how to use the character set generator provided. This reviewer found that the sets provided (all of them) were very hard to read and use. Most of them use proportional spacing, so computer output does not line up at all with most received data since spaces are inserted by the transmitting computer for tabbing purposes. The mono-space character set provided has letters that are quite small and hard to read on my Hi-Res monitor – they probably could not be read on a regular television with a modulator.

Another distinguishing characteristic of VISITERM is its ability to define and use protocol characters on file transfer. You can set the EOB, ACK, STOP, and START characters. Many programs support the START/STOP protocol, but few also support block operating and the EOB/ACK protocol. One problem with this is that the protocol is only supported during file transfer operations and not during normal terminal operations.

With VISITERM, there is a 256-character type ahead buffer for use while data transfer operations are taking place. The only problem with this is that the default communication mode is half-duplex and you can't see what you are typing until the character are sent and/or echoed by the other computer.

VISITERM supports keyboard macros of up to 249 characters each. The manual states that the macro space has a fixed capacity, but doesn't state what that is. The prompt within the macro section says that the limit is somewhat over 1,000 characters. An interesting use of macros might be to redefine the keyboard. This can be interesting if you know or use the newer KVORAK keyboard configuration.

Only text files can be transferred using VISITERM, but there are utilities on the disk which allow converting Applesoft programs and binary files to text form. Another utility exists to return text files to binary form and EXEC will reconvert text files to Applesoft.

A good addition to the manual in this case is an appendix titled "A Primer on Data Communications". Included in it is a good description of the basics of data communication using a modem. If you don't know anything about data communications, this is a good place to start reading the manual. Another appendix outlines the various hardware configurations supported by the program while a third presents everything you ever wanted to know about ASCII characters.

CONTEXT CONNECTOR

Company: Context Management Systems
Language: Applesoft
Hardware Requirements: Apple II or II +, 48K, and at least one disk drive. Supports selected communications cards.

Department: Business
Sugg. Retail: $180.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	C	ERROR HANDLING	A
VENDOR SUPPORT	B	VISUAL APPEAL	B		

The basic purpose of the CONTEXT CONNECTOR is to allow the user to get information from other computers and transfer it into "Visicalc" models. You can also combine results of several "Visicalc" models into a consolidated model. In the process, you are also allowed to format text files created in any manner (as well as those residing on disk as Applesoft text files) and enter these files into "Visicalc" models. This program operates on any text file — it does NOT have to be in the Data Interchange Format (DIF).

With CONTEXT CONNECTOR, the "Visicalc" program capabilities may be expanded greatly and used for a variety of very large accounting applications. You may create accounts on individual forms and then feed the results of these into a general ledger format. In this way, for each accounting period, summaries are produced on blank forms created to receive them. "What if" questions regarding the ledger may then be asked for planning purposes.

The CONNECTOR program also comes with a communication interface for transmitting files to and receiving files from a remote computer. With this feature, stock reports may be obtained from The Source, stored on disk and then later formatted for entry into "Visicalc". The communications interface cards supported are the Hayes Micromodem, the Apple Communications Card with modem, or the SSM/AIO board with modem. (See the comments below relating to this feature.)

The CONTEXT CONNECTOR comes with either DOS 3.2.1 and DOS 3.3. Both versions are provided — one on either side of a disk. There is a reference card consisting of the text for each menu in the program. The final item provided is a rather skimpy manual outlining some of the features of the program, but by no means all.

Initial testing of the basic conversion capabilities demonstrated that the program performed as advertised. In the example, files provided you include the capability of transfering two lines from one "Visicalc" model and two from another into a third blank format. The program accomplished this simple task correctly; there is no reason to believe that it would not do so for larger files up to the limits of memory.

In another test, a text file was formatted for entry into "Visicalc". Again, the test was a success, although this particular method of generating "Visicalc" formats is quite time-consuming. The model changed was 33 lines long by seven columns wide, requiring some three minutes to convert. Large models will take quite a bit longer; therefore, this type of conversion should only be used if you can spare the time or if it is inconvenient to create DIF files for direct entry into "Visicalc".

CONTEXT recognizes the relative lack of speed in the program and has provided several suggestions on how to organize files and formats to increase the transfer rate.

Problems occurred when the communications features of the program were tested. First, the program's ability to handle lower case was attempted (the claim is that it will). Both the DoubleVision and the 40-column lower case display are supported. This reviewer uses the Videx; while attempting to fool the system, the program bombed. As a backup, this reviewer also has a Paymar board (which is supported). Lower case was displayed as the default mode. Unfortunately, this is not pointed out in the manual and there is no discussion of how to shift to upper case on either a single letter entry or locked-in upper case. In this mode, this reviewer was not able to log onto The Source. A successful log-on is accomplished only when the default setting is upper case operation only. We are told by the manufacturer that a new version will be coming out which will support the other 80-column boards. That should solve the problem noted above.

Two other comments must be made about the communications portion of this program. The program appears to implement half- and full-duplex in a manner opposite to that which is correct This is because the program displays what actions will take place when you execute a command, not the status. (For example, if the instructions say half-duplex, it means if you push the key, you will switch to half-duplex, etc.) This takes some getting used to, since most other such displays show the status and not the option. There is a choice of line formatting: "on" or "off". The line formatting feature, when on, will cause a wordwrap should the output exceed 40 characters. Finally, when an attempt to save a captured file was made, it could not be saved and was ultimately lost. There was no description of the error message appearing on the screen. As it turns out, the attempt to save the file was made to a second disk drive. The program does not now support two drives. We are told that the next version will.

This program could ultimately be quite useful if it could be speeded up considerably (perhaps by using an Applesoft compiler or rewriting in machine language) and if the bugs found during review testing were fixed. The manual could stand extensive rewrite as well.

MICRO-COURIER

Company: Microm, Inc.
Language: Applesoft
Hardware Requirements: Apple II or II + Hayes Micromodem. Clock card and printer recommended.

Department: Business
Sugg. Retail: $250.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B+	RELIABILITY	A
EASE OF USE	A	VALUE FOR MONEY	B–	ERROR HANDLING	A
VENDOR SUPPORT	B+	VISUAL APPEAL	A		

The MICRO-COURIER program is advertised as being able to solve the electronic mail problems of modern companies. To some extent, the program accomplishes these goals, but only in a limited way.

So long as the user recognizes that this system is obviously designed to be specifically utilized as an electronic mail program and that it best communicates only with another MICRO-COURIER program, then, at that point, a decision can be made on its use for your application. If the user sees this software as a new terminal program applicable to all uses of a modem, he is in for a disappointment. That said, the main features of the program and commentary on them follows.

The package comes with one disk and an instruction manual. Replacement disks are free to registered users within 90 days; the cost is $35 after that period. There is no provision for a backup copy, so you will be without the program during the period of replacement. You are in effect buying a license to use the software and not the software itself; consequently, a backup copy would provide you with two disks to use and therefore violate the licensing agreement.

The main menu describes the major tasks that the program performs: create and edit mail files; review and address outgoing mail; send and receive mail; review incoming mail; perform mailbox directory maintenance; switch to terminal mode operation; and run system utilities.

The create/edit mail files is the word processor portion of MICRO-COURIER. You are allowed to create files, edit them, and print them. There are two major limitations of the editor: messages are limited to 4,000 characters and only upper case is supported. The editor is only good for outgoing messages that you create unless your incoming mail is in the form of a text file of less than 4,000 characters. Text is entered without regard for the screen size and words will split at the end of the screen. Formatting is performed by the print program. The return key signals an end of paragraph to the program. Cursor control for editing purposes are paragraph, line, word and character-oriented rather than screen-oriented. The control keys are nicely arranged for remembering their functions. The delete character function has a "lock" on it; you must use it twice to delete anything.

The second main menu function allows you to address messages (log them into the system), review the log of all messages (ready to send or sent), review the log of all messages sent, delete mail, or print copies of messages from the send log. When you log messages to send, you have the choice of sending them to a specific person or to a list of addresses. Each individual on your "mailing list" is given a mailbox ID number (see mailbox directory maintenance below). Distribution lists are made up of a number of individual mail box IDs. Essentially, what this section does is link the mail boxes you have established to the files you have set up and allows you to determine when you want what sent to whom. The files sent do not have to be files created by the MICRO-COURIER editor. Any DOS 3.3 file in any machine-readable form may be sent (including binary files). The previously described editor simply helps you create messages for sending. With a clock card, you have the option of specifying when (date and time) you want the files sent. Routine maintenance functions consisting of review, deletion, and printing of the logs are provided. If you do not have a clock card, messages will be sent immediately upon entering the send message mode of operation from the next option.

Sending and receiving mail is the heart of the program and what makes this a different terminal control program. Up to 100 messages may be queued for automatic transmittal at any one time. For each, at the specified date and time, MICRO-COURIER will dial the destination and transmit a message. The program is supposed to try dialing repeatedly if the destination line is not available. It will do so only if you have a clock card. If, instead, you are expecting mail, there is a mode for receipt of messages where the program will answer the phone and a mode for accepting incoming messages and files. An interesting feature of the program is its ability to operate in both accept and answer modes at the same time. A third option presented to you is "send and receive", where your messages will be sent at the predetermined times (or as closely thereafter as possible) and, when not sending, will receive incoming messages. If you expect much incoming mail, a second disk drive is essential, since the program disk must remain in drive one. The system logs all activity for later recall and review.

One important point needs to be made about this system's transmission and receiving limitations. The sending and receiving functions of MICRO-COURIER are specifically designed for machines with only the MICRO-COURIER software. There are no provisions for automatic log-on to a system which requires identifications and passwords to be sent before message traffic can take place. This means, for example, that you should not buy this software and expect to be able to automatically transfer messages to the SOURCE or any other such timesharing system! Provisions are made to do this manually (see terminal mode description), but you must control the operation yourself.

The display mail functions are what you might expect from a mailbox system. You may display and/or print the mail, print a log of the mail, and, if you are in a hurry, dump mail from selected addresses only. To keep files apart, all received files are stored with an internally assigned filename. A counter is kept and incremented for this purpose, allowing you up to 90,000 messages before the counter is reset, at which point files will be deleted automatically. Well before that time, you should have reviewed the incoming log for renaming and storing those messages and files that are important to you. Of course, you have the option of messing things up, since Apple DOS will allow you to rename a file to a name that already exists, giving you fits on any attempted recovery.

The mailbox directory maintenance function allows you to establish or edit the identification(s) of users you want to send mail to. There are 99 mailboxes available in the system. You may fill any or all mailboxes with telephone numbers and names of users. These are then linked to files as described above. Each phone number may be up to 36 characters long (including numbers and pause characters). This should handle most, if not all, of the combinations of access and user codes, plus phone numbers that you might come across. The pause character (*) allows a delay for two seconds when dialing for the purpose of automated switchboard function changing. The program was checked with a Hayes Micromodem and advertising support for "... most autodialing, Apple-compatible modems." You would be wise to check program operation in the store if you have other than a Hayes Micromodem.

Other functions of mailbox directory maintenance allow printing of the directory, plus adding, changing, or deleting entries. Distribution lists may also be created with this function.

For manual control over the information transfer, MICRO-COURIER provides a terminal mode of operation. In this mode, you may directly transfer information to and from a remote computer, or you may manually send DOS files (with some limitations). If you are NOT connected to another MICRO-COURIER program, then only text files will be handled. You must be connected to a like program for binary and program files to be sent. Standard baud rates are supported; the program was tested for up to 300 baud. Either half- or full-duplex is supported.

There is one rather serious error in the implementation of the terminal mode of operation. The manual correctly describes full- and half-duplex modes, but the program implements them in the opposite manner. If you want full duplex operation, you must tell the program to give you half-duplex! This is not difficult to remember, but certainly annoying.

For the terminal mode, escape sequences are provided for the symbols that do not occur naturally on the Apple keyboard. One other minor annoyance is that all escape and control characters received go into the *receive file.* There is no option for rejecting these.

The utility section allows you to catalog a disk, reconfigure the system, set a date and time, and perform file maintenance (copy and delete files). For a one drive system, the copy file routine will only make a duplicate file on the same disk; there are no provisions for disk swapping — consequently, this utility is of little use.

In general, the MICRO-COURIER program is well implemented. All functions are menu driven and all prior menu titles are shown above submenus — a handy feature for determining how you got to where you are. Except for transfer of non-text files, this reviewer questions the claim of the company that there is "almost non-existent" competition for this product and, what competition exists, requires a large investment. Electronic mail, using the SOURCE as one example, is perfectly capable of doing many of the same functions at reduced cost in equipment, since only a small terminal is required.

HAYES TERMINAL PROGRAM

Company: Hayes Microcomputer Products, Inc.
Language: Machine code
Hardware Requirements: Apple II/II + with Hayes Micromodem. Printer and 2 disk drives helpful.

Department: Business
Sugg. Retail: $99.00
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B –**	DOCUMENTATION	**A**	RELIABILITY	**A**
EASE OF USE	**C +**	VALUE FOR MONEY	**B –**	ERROR HANDLING	**A**
VENDOR SUPPORT	**B +**	VISUAL APPEAL	**B +**		

The *Hayes Terminal Program* is designed to work directly with the Hayes Micromodem in the Apple computer. It is sold with the modem card, or as a standalone terminal program. The three formats most often found with the Apple computer (Dos 3.3, Pascal, and CP/M) are all supported on the data disk used with the *Terminal Program.*

The program is menu driven. Communications commands include the ability to originate, answer, and terminate calls. File commands create, receive, send, and list files. System configuration is also controlled by menu commands. The entire communications environment may be controlled by the user (with the changes allowed for one-time use or permanently recorded to disk).

Sending files may be done with one of three protocols: stop/start, line, and verification. The stop/start uses the standard CTRL-S and CTRL-Q (or any other characters you define). Line protocol will send each line and wait a defined interval before sending the next line. Verification protocol works between two Terminal programs, and sends blocks of data repeated one or more times until data transfer is guaranteed, or the defined number of tries is exceeded.

The *Terminal Program* supports up to six disk drives, a number of printer interface cards (defined in the manual), forty and eighty character screens, and lower case characters (assuming some hardware modifications to the Apple). Three phone numbers (up to 35 characters long), and one prefix, may be stored for quick dialing. The storage of macros, which allow user sign-on to systems, is NOT supported.

The user manual is very complete, and reasonably well organized. Virtually anything you want to know about the Hayes Micromodem may be found in the manual, including discussions on how to interface it to programs that you may write. The company ought to sell this manual alone for those with modems who may not want the program, but would like to understand their hardware better!

In the receive file mode, the program accepts characters from the host computer until the character count reaches 1024, at which point the stop character is sent and the material saved to disk. The start character is then sent, and the reception of material continues until another 1024 characters are received and saved. This continues until the file is received. The only problem with this process is that the program inserts an extra carriage return after each 1024 characters. You will have to go back later and fix this with a word processor since it could happen between letters in a word.

The *Terminal Program* is a reasonably good general purpose program for use with the Hayes Micromodem, and should suffice for many applications.

DATALINK

Department: Utilities
Company: Link Systems
Sugg. Retail: $99.95
Language: compiled UCSD Pascal
Availability: 6
Hardware Requirements: 64k a modem-card UCSD Pascal 1.1
Disk or Tape: Disk

OVERALL RATING	A–	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	B	USEFULNESS	A
VENDOR SUPPORT	A–	ERROR HANDLING	A	VALUE FOR MONEY	A

Datalink is a well thought out telecommunications program for users of the UCSD p-system. The complete UCSD software system, Apple version number 1.1, with the associated editor, filer, and boot programs, are required to run this program. A modem is needed to connect to the telephone line — the manual lists Hays Micromodem II, Novatron Apple-Cat II (300 or 1200 Bell 202/212), SSM AIO or Cal. A Computer 7710a or Apple Comm card with external modem are also required.

The program quickly establishes which modem is where, if there is a printer, and if it's on or off. The menus in the program mimic the UCSD format, and make the program seem familiar and easy to use. All customary communications functions are supported, a list of phone numbers can be defined, communications protocol defined for each phone number, and macros can be sent. In the terminal mode, it can store received data in a 4K buffer, and stored disk by command. In the transmit mode this will transfer any Apple Pascal file to another Apple (suitably equipped) with error checking. The definition of different file protocol is simple to master, and the current protocol to be used is displayed on a status line with the main menu. In addition, it is possible to "back out" of the program while on-line and run any UCSD p-system program (Pascal or Fortran), or use the editor or filer and return to the *Datalink* program and resume communications.

The program is a pleasure to use, as are all one letter commands, and can be typed as fast as you please, letting the system catch up when you stop typing. The designer of the program thoughtfully included a triangular reference card that can be used while on-line for finding any command or other information about *Datalink*. This is in addition to a 60 page indexed manual.

Once set up, *Datalink* can be used by almost anyone. Several people, unfamiliar with computers in general, hardly noticed *Datalink* at all — it is just that easy to use. About a dozen different computer systems were tested, and *Datalink* performed faultlessly. Although many BBS systems and timesharing systems cannot accept information as fast as the automatic logon will send it, to insure reception of data the delay after CR can be set to 500 and the delay after char set to 50. A Link Systems representative indicated that these were maximal values and could be lowered for many systems.

The buffer size is only 4K, not overly large. When full, it is automatically stored to the disk, which is a handy feature. During the time it is writing to the disk, it will try to get the sender to halt transmission with the EOB-ACK protocol. If this doesn't work, a few characters will be missed at that point and the text will appear slightly scrambled.

Datalink is a well designed piece of software. For those using the Apple Language card system, it can easily replace all other communication programs I have seen.

A-C-C-E-S-S

Company: Desert Technology
Language: Applesoft
Hardware Requirements: Apple II or II + with 48 K, two disk drives, Hayes Micromodem, Mountain Hardware clock, Printer, Videx 80 column card or lower case adapter

Department: Business
Sugg. Retail: $2,500
Availability: 2
Disk or Tape: Disk with hardware protection

OVERALL RATING	C+	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	A	VALUE FOR MONEY	C	ERROR HANDLING	B
VENDOR SUPPORT	B	VISUAL APPEAL	N/A		

The A-C-C-E-S-S (Automated Computer Communications Electronic Service System) software is designed for the handling of data at any time, using standard phone lines. The data handling can consist of a bulletin board, an electronic mail handler, a message center, a system for direct entry of orders for goods and services, etc. It operates in much the same way as all bulletin board and message systems. Its low rating comes from the excessive (in this reviewer's opinion) cost. For $2,500, the program should do something really exotic or special.

Be advised that this software is NOT a terminal program in the sense that it will not accept long files from other systems for downloading purposes. This is a message system only, with the messages being line limited.

The system is user friendly, in general. If you desire, you may use the system to obtain specific information for orders; additionally, you may set up the prompts for the information in advance. With password access to the system, you can set things up so that only selected salespeople have access for entering specific information. Or, by eliminating most prompts and deleting the need for password access, the system can be made a general user bulletin board or mail system. The operator controls all aspects of system use through set up file(s).

Roughly 100 average length (16 line) messages can be supported without excessive delays; additionally, up to roughly 150 messages can be supported at any given time. For general use as a bulletin board or as a message center for a large number of people, this message limit can be a constraint if the system is not cleared often by the operator.

After logging on, the system asks questions much the same as the Apple Bulletin Board program. That information is logged into a user file (if desired), then the system goes on to display its welcome message and any bulletins you have defined. Because there is a mail function, make certain that when you logon to the system, you do it the same each time. If not, you may not get your mail.

Within any subsystem of the program there are several control characters that may be used for different text manipulations. These include scrolling through the text at a faster rate and display stop. Other commands retype all or portions of the text and kill the current function.

The subsystems (functions) supported by the program are 24 in number and range from simple set up (Apple 40 column mode) to mail and subject search routines. There is a help function for the newcomer.

One advantage that this system has over others of a similar nature is the input to the system for external sources need not be from an Apple and similar software. Any standard terminal will do. The outside user has the option of having lower case supported or not, depending on his/her terminal configuration.

The system also supports differentiation between new and expert users of the system. The user, through a function command, can declare expert status and be spared some of the prompts normally used by the system. This is an important feature for those that use the system often.

The message function is well organized. On leaving a message the user must identify a category and subject. The program will then allow other authorized users to scan through the messages by category. The operator defines the allowable category. Users may also simply scan all entries. After scanning through the messages, the user may then call up individual messages to print in full. These are called up by their unique message numbers and assigned by the system upon message entry.

There is a help function available to system users. It describes such items as how to use the system and what categories are available for messages.

After logging on, the system searches the message file and looks for any messages addressed directly to you. The message numbers are returned for later downloading and answering by you. Through the mail subsystem, you may send mail to any other user.

In the forms and orders subsystem you are given a form to fill out. Several forms may be stored on the system and a help command exists which will print out the list of forms.

The operator is given several options for system maintenance. These include the ability to print the logfile, packing the message file to conserve disk space, and deleting messages. The frequency of performing these operations should be geared to the intensity of system use. There is no opportunity to do statistics on the logfile; this should be provided to determine the most active user(s).

One item not specified in the hardware list, but one which is a virtual requirement for running the program, is the Applesoft language in ROM. When running the program and setting things up, the master disk boots several times. Thus, with a language card and Apple II with Integer Basic in ROM, the user must reboot with the DOS master disk and then run the bootup program on the A-C-C-E-S-S disk. This is not explained anywhere in the manual and causes a great deal of disk swapping.

COMPUSERVE

Company: Compuserve Communication
Language: N/A
Hardware Requirements: 48K Apple II/II +, 300-Baud modem

Department: Business
Sugg. Retail: $20 + hr. fees
Availability: 10
Disk or Tape: N/A

OVERALL RATING	**B**	DOCUMENTATION	**D**	RELIABILITY	**B**
EASE OF USE	**B**	VALUE FOR MONEY	**A –**	ERROR HANDLING	**A**
VENDOR SUPPORT	**B**	VISUAL APPEAL	**C –**		

Compuserve Information Service is a subscription service which any microcomputer owner can use if he has a modem and has received his password from a Compuserve representative. Like the Source, Compuserve has a one-time subscription fee. At the present time, the fee for a non-prime time user is only $20.00, and thereafter you are charged $5.00 per hour (last I knew) for on-line service. Non-prime time is reckoned to be after business hours, or after 6 pm in your particular time zone.

The hourly fees of Compuserve are less than those charged by the Source, and Compuserve does not charge a monthly minimum, as the Source does. At the time of this review Compuserve had more subscribers, less expensive rates, and faster response time than the Source — and yet remains less well-known. In addition, Compuserve gave three free hours to every subscriber when he first signed on. (It isn't clear, however, whether this "free time" policy will be continued indefinitely.)

Compuserve offers similar services to those of the Source: electronic mail, electronic catalog shopping, education, games, Dow Jones updates, word-processing, entertainment — in fact, over 1200 different functions are available to subscribers. These services are all easy to access and use on Compuserve. One nice feature that Compuserve offers which the Source does not is a simulation of "CB" radio channels. People on the service can talk to each other via keyboard, just as CB radio users do over the airwaves. The user has over 30 channels to choose from and can talk to anyone across the continent who happens to be on the "CB" at the same time.

Compuserve users must re-subscribe to the service if they wish to have the ability to use the Compuserve Services during the day. At the time of this review, Compuserve subscriptions were available through Radio Shack stores (or call direct toll free, 800-848-8990, if you are interested). The reference manual for the Source is a model of good documentation, and unfortunately Compuserve's manual falls far short of this ideal. But, like the Source, Compuserve makes extensive use of help menus which more or less make the reference manual unnecessary.

Currently, Compuserve appears to be very good value to the Apple owner looking to explore the realm of telecommunications and information service networks.

HI-RES CHARACTER GENERATORS

HIGHER TEXT

Company: Synergistic Software
Language: Machine
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $32.50
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	B
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B

Higher Text is a complete package for generating text on the Hi-Res graphics screen. Being a machine language program, it can be used within a Basic program without interference. It contains a full upper and lower case 96-character ASCII character set. Characters may be printed in several sizes, shapes, and colors with selectable background colors. Ten colors are offered.

The program comes with an editor for modifying or designing your own characters or character sets. *The disk* comes with six character sets (mostly large fonts, plus one set with three small fonts).

The program is extensively documented for easy reference and is no harder to use than printing text to a normal text screen.

SCREEN MACHINE

Company: Softape
Language: Integer & Applesoft
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	B–	VISUAL APPEAL	B	USEFULNESS	B–
VENDOR SUPPORT	C	ERROR HANDLING	B	VALUE FOR MONEY	B–

Screen Machine is a graphics utility package for creating character sets ranging from foreign alphabets to Hi-Res playing cards. Each character is defined as a 7 x 8 dot matrix. One simply decides whether one wants to plot or not plot as one steps through the 56 positions of the matrix. One can backup or restart. One saves the set to tape or disk.

Once a character set is defined one can assign it to the characters on the keyboard. The program is transparent to your programs so one can simply print the new characters using basic print statements.

GRAPH PLOTTING PROGRAMS

APPLE II BUSINESS GRAPHICS

Company: Apple Computer Inc.
Language: Applesoft
Hardware Requirements: 48K Apple II/II+, 2 disk drives, 16K (language) card, printer.

Department: Business
Sugg. Retail: $175.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	A–	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B+	ERROR HANDLING	B+
VENDOR SUPPORT	C	VISUAL APPEAL	A		

The *Apple II Business Graphics* program is an extremely flexible program which will easily and accurately produce complex business data graphs. This program supports all graphics formats that you may need. In addition, the program offers a rather sophisticated curve fitting and statistical features, which, once applied to the data, appear on the graph line along with the raw data.

The program displays graphs in black and white, or in color. Multiple sets of data may be plotted using different characteristic point styles. You can graph single or multiple bars (up to four per label), in either horizontal or vertical format. You may also combine any of these forms, and fill in the area under curves for greater visual impact. *Apple II Business Graphics* draws a variety of "pie"-type charts as well as line and bar graphs. Data points are stored in Pascal files, entered manually with a program editor. Alternatively, you may create programs which build correctly formatted files. A third feature offered is INTERCHANGE, which lets you read files created by *VisiCalc*, and files produced by *Apple Plot*. However, INTERCHANGE only proceeds in one direction. You may not create files for transfer back to standard DOS format.

Many mathematical operations are built into the program, including the ability to manipulate current data in the workfile, and also to add, subtract, multiply, and divide numerical data in files. Statistics, such as mean and standard deviation, may be obtained from your data points.

Another very useful function in the *Apple II Business Graphics* program is curve fitting. Four modes are available: straight line, logarithm, parabola, and sine. The program reports the standard error for each curve fit, so that the best result may be obtained. Moving averages are also available. With labels sufficiently extended beyond the given data points, you may use the curve fitting functions to make future projections.

Once you have created graphs to your satisfaction, you may save them in Pascal files, either as a simple text file containing the data points, or as a binary screen dump to disk. One poor feature of the program is that the text file does not store all of the formatting information, axis titles, or floating titles. Information on these items is available on the screen at the time the graph is created. If you copy it down, relatively straightforward recreation of the graph is possible.

You can also dump the screen image to one of a small number of designated printers: the Apple Silentype or the Qume Sprint 5/45. In addition, you may use one of two plotters: Hewlett Packard 7225A or Houston Instruments' HIPLOT (DMP 3 or DMP 4).

The complete program package consists of a manual, two copies of the program disk, a data disk incorporating a tutorial guide, and one blank, uninitialized disk. The manual is excellent, but if you lose it, or the quick reference card supplied with it, you will still be able to operate the program since there are built-in help instructions.

The program runs as described in the manual; only one item was not covered by it, the assumption that there is no terminal card in Slot #3. With such a card, you must continually shift between the 80-column display mode and the normal Apple screen. This was not mentioned. Further, with the 80-column card in Slot #3, the Clear Screen command does not work for the graphics screen.

The program is relatively easy to use. Most other graphics programs are menu driven, but this one is command driven. The commands are in simple English, and, with a bit of practice, easy to remember. If you like, you can create a command file which will produce and/or display graphs unattended.

Apple Computer also offers what seems to be an identical package called *Apple III Business Graphics* under their Special Delivery Software label. For it, you need an Apple III with 128K of memory and at least two disk drives. A color monitor is helpful (up to 16 colors may be used in graphics displays); and this package supports the same printers and plotters noted above.

If you require complex graphs of business data, then these programs are likely to meet your needs. Consider them seriously.

VISIPLOT [Version 1.0]

Company: Personal Software, Inc.
Language: Applesoft
Hardware Requirements: Apple II or II +

Department: Business
Sugg. Retail: $179
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B +	DOCUMENTATION	B +	RELIABILITY	A
EASE OF USE	B +	VALUE FOR MONEY	B	ERROR HANDLING	A –
VENDOR SUPPORT	B +	VISUAL APPEAL	B		

NOTE: VISIPLOT is advertised to be compatible with "Visicalc."It will only directly interface with the 16 sector version of "Visicalc", not the 13 sector version.

VISIPLOT is a highly-touted plotted package that has some rather unique features plus some possibly restrictive characteristics. You encounter the first unpleasant feature on booting. If you have a language or 16K card, you must first boot the DOS 3.3 system master disk to load Applesoft into the card and then RUN INIT on the VISIPLOT disk. Applesoft should have been installed on the VISIPLOT disk for loading the card directly.

The program itself is menu-driven, with a clever 3-line menu that in fact allows you to choose among many options. Most of the options are relatively easy to interpret without having read the manual (the sign of a good menu structure); however, there are some tricks to using all the features of the program. Therefore, the manual should be carefully read before use.

The documentation is structured as a tutorial that takes you from booting the system through all of the program features. In spots, the manual may seem elementary, but stick to it; going through all of the examples is well worth the effort in learning the program. There is also a summary card and reference section included.

Data are stored in groups, each of which is termed a series. In each series, you may store up to 150 points. You are allowed to have several series in memory at the same time (up to 645 total data point limit). One or more series of data may be then combined and stored to disk as a file. In this way, the same data points may be used in several files for different combinations of data. When loading files into memory from the disk, you are allowed to add a new file without erasing memory (up to 645 point limit). This is useful for transferring all data you want to manipulate into memory when moving from the file handling program to the plot program.

When storing data, you are give the option of doing so in a normal fashion or in the DIF format, which can be read by new versions of "Visicalc". In addition, all functions that affect files are verified in case you made a mistake. You are given ample opportunity to reverse yourself. The program even checks the disk to determine if you have any VISIPLOT programs on disk you wish to initialize. In short, the error trapping and handling is excellent.

The plotting program is well done and has many features for use in business. Graphs may be formatted using the entire screen or the screen can be split horizontally or vertically. Several data series may be overlaid on the same graph if the scaling of the data will permit all of them to fit within the visual separation. Line, bar, hi-low, and pie charts are available with overlays and full-titling features as well.

Title-making ability is particularly impressive. You may add one title to the top of the chart, one to the left side, three to the bottom and any number you want to the body of the chart. The movable titles can be placed anywhere in either normal or inverse characters. The only caution is that once placed, a movable title cannot be changed — you would have to redo the graph from the start.

Graphs are automatically scaled by the program. The data are searched and scaled so that the graph produces a pleasing configuration with round numbers along the Y-axis. If for some reason you want to change the scale, you are given that option. On rescaling, the program checks for obvious errors for what you have specified and corrects. For example, if you put the minimum value above the maximum, the program will reverse them for you.
One rather serious problem with the program that limits its usefulness in areas other than business is assumption that X-axis data is somehow related to time in years and parts of years. If the X-axis data is serial in nature (from 1 to 99), this is not too much of a problem, but if it goes above 99 the scaling and display function may yield strange results. In one example included with the program, the X-axis read as follows: 0 . . 14 . . 28 . . 42 . . 56 . . 70 . . 84 . . 98 . . 12 . . 26 . . 40. Assuming that the data represented years, the last three numbers were truncated from 112, 126, and 140 to those shown. This can be confusing.

One of the unique charts that can be prepared with this program is the pie chart. Each segment of the pie can be individually colored and, with the movable title feature, labeled. Observe carefully the constraints on labeling, since errors cannot be corrected and you must start over.

Another charting capability that is provided is the scatter plot. With this option, you may plot one set of data against a second set over a given period of time. Each point on the chart represents a given point in time and the chart represents progression through time.

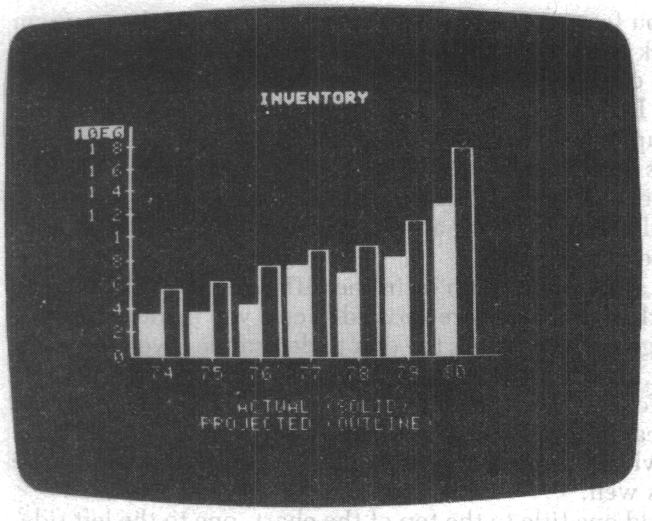
Any of the charts and graphs produced by the program may be printed directly on several graphics capable printers. The program is set up for the Apple Silentype, but printer drivers are also available for other machines such as the IDS 440/445. Instructions are provided that show one how to change the driver used by the program and short programs are listed in the instructions which show how to use the drivers in other programs that you might write.

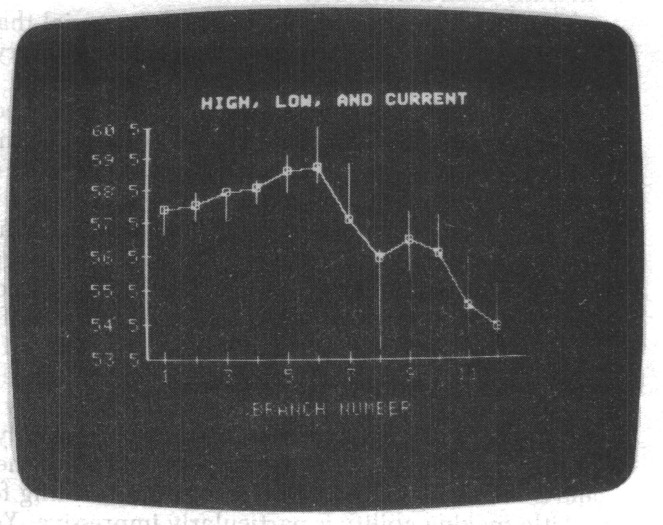
The main program allows you to edit data in memory or enter new data. One series of data points may also be merged with another under certain conditions. Given a set of data, points may be inserted or deleted. One caution should be stated. When you have set up your time series in the X-axis and want to insert a point, the time series does not change, only the data relative to the series changes. Use caution.

The edit function also has an option called UNDO. When this option is exercised, everything you have done since the start of the editing session is undone. That includes all data entered if you have not returned to the main menu ahead of time.

One especially bad feature of the edit subsystem is the print function. Print only dumps what is on the screen to the printer. At a minimum, the option to dump the entire data series should be given. As written, the only way to get a complete printout is to print the screen, move the data down, print again, move the data down, etc.

All in all, VISIPLOT is an interesting plotting program with quite flexible characteristics. The buyer is cautioned that it does have some unusual features and should study them carefully in light of user requirements.





VISITREND [with VISIPLOT]

Company: Visicorp
Language: Applesoft
Hardware Requirements: Apple II or II + with 48K

Department: Business
Sugg. Retail: $249.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B+	ERROR HANDLING	A
VENDOR SUPPORT	A–	VISUAL APPEAL	N/A		

VISITREND is effectively an extension of the VISIPLOT program; consequently, the two are marketed in a combined package. (Refer to the review of VISIPLOT elsewhere in this copy of THE BOOK.)

Using VISITREND, you may perform the following operations on a data series:

1) Data smoothing using moving averages, percent of change, leading, lagging, and cumulative functions.
2) Data transformation using sums, loss, or any other mathematical or logical transform.
3) Linear multiple regression (least squares).
4) Trendline forecasting of raw, smoothed, or transformed data.
5) Major multiple regression statistical measures including the T-statistic, R-bar squared, F-statistic, and the Durbin-Watson statistic.
6) Other statistical measures such as minimum, maximum, mean, variance, standard deviation, and correlation coefficient.

Assuming you have loaded your series into memory from the VISIPLOT main menu, entry into VISITREND requires only four keystrokes (right arrow, space bar, return, and Y to confirm). The menu within VISITREND follows the same outstanding format as the parent program.

One important thing to note is that memory for data storage is limited. VISITREND creates a new series with many of its functions. Filling memory is rather easy. Use the "lookup" feature to check memory often.

Once a series is created and displayed, you may print the data. The same complaint is noted here as with VISIPLOT; you may only print what is on the screen. There is no way to print the entire series as a unit.

After the series is created, the "analyze" function will perform a statistical analysis and display the results. This is copacetic as far as it goes. Unfortunately, to save the results, you must copy them down or print them. There is no way to save them to disk for use by other programs (like "Visicalc"). It would seem that the results could be placed into the DIF file for transfer and use by other programs.

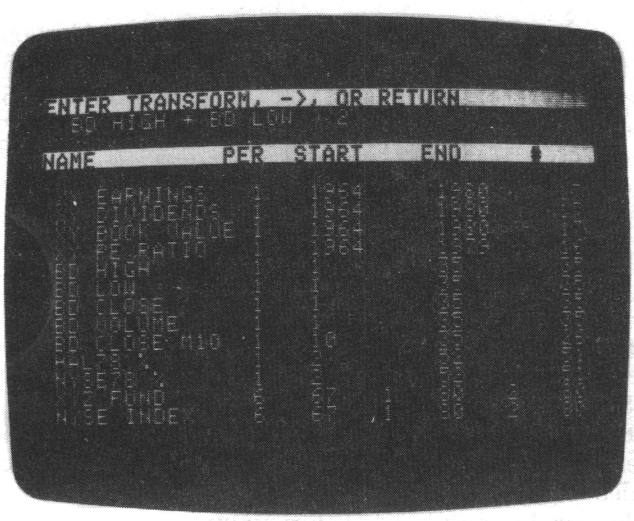
Regression calculations may be performed on the raw data or on transformed data. Be patient during this period. Calculations may take up to a minute depending on the number of data points. Again, you must print or copy the results in order to save them.

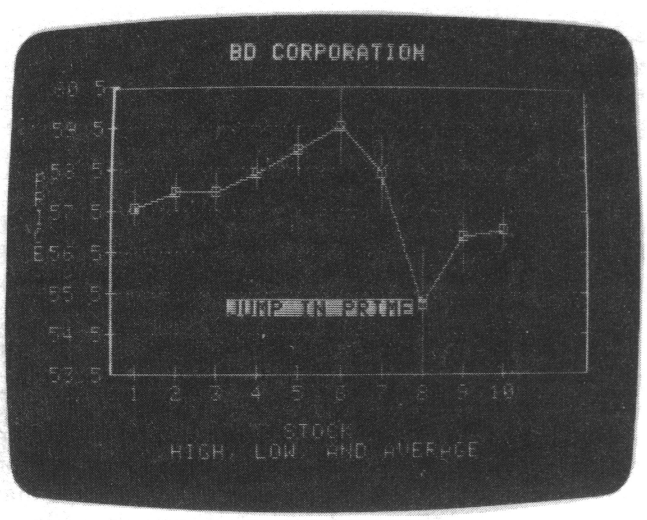
From the regression function you are able to create a forecast as a linear extrapolation of the analysis.

The moving average and smoothing functions can provide useful information from noisy data, but you should know what you are doing. The program will do what you tell it to, but cannot evaluate the adequacy or usefulness. Remember the maxim which states that statistics are a great way to fool oneself.

A unique part of the VISITERM program is its ability to transform data. This "xform" function lets you write your own formula (limited to 80 characters) using all Applesoft operators and functions. When using a basic function, you are allowed to insert a series name as the value the function which it operates on. For example, LOG (SERIES NAME) creates a new series with each data point being the natural logarithm of the original series. Take care that you follow the instructions when inserting the series name. If done incorrectly, an error results.

VISITREND is a useful addition to the VISIPLOT program which could be made more useful by the ability to save the results for use by other programs. You must know what you are doing. There is an old saying that statistics don't lie, but liars use statistics, in addition to the capability of bamboozling yourself, as mentioned above.





APPLE PLOT

Company: Apple Computer
Language: Applesoft in ROM
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $70.00
Availability: 9
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B+	RELIABILITY	B
EASE OF USE	B–	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	B	VALUE FOR MONEY	B–

APPLE PLOT provides the user with an excellent method of utilizing the Apple II's superb color graphics capabilities for displaying information. It is a menu-driven program which may be used to generate custom graphs of up to 100 data points in each of two data sets. The plot techniques can be selected from six formats:

(1) Standard graph — line graph of one data set.
(2) Standard graph with data overlay — line graphs of two data sets.
(3) Bar chart — one data set.
(4) Multiple bar chart — two data sets.
(5) Scatter plots — unconnected dots.
(6) Mixture — consisting of bar charts and standard graphs.

The data entry and editing routines are very straight-forward. One enters the point number, followed by the X and Y coordinate values. The drawback is that a return must be entered after each data entry since each piece of data (not each data point) is stored as individual segments in a sequential data file. Editing allows insertion or deletion of a complete data point or changes in any X or Y value.

The program features automatic scaling and labeling of the axis. One can also insert two additional labels inside the graph. Graphs can be saved to disk as pictures to be presented in slide show fashion or for dumping to a printer. The program supports Hi-Res screen dumps to both the Apple Silentype and Qume Sprint 5 printers. APPLE PLOT also includes a program for converting VISICALC data to a format used by its plotting program.

The program is much more suited to business rather than scientific applications because of its 100 data point limitation. As compared to Muse's Data Plot, this package is more expensive and doesn't offer pie charts. However, unlike its competitor, it maintains data on disks using standard DOS. This may be a real plus for interchanging data between programs.

DATA PLOT

Company: Muse
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $59.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C+	DOCUMENTATION	B–	RELIABILITY	B
EASE OF USE	C	VISUAL APPEAL	B	USEFULNESS	C+
VENDOR SUPPORT	C	ERROR HANDLING	B–	VALUE FOR MONEY	B

DATA PLOT is a graph plotting program that allows you to display numeric data as a either bar charts, line graphs, scatter diagrams or pie charts. It allows you to enter, edit and save the data tables for plotting and display at a later time. It also supports hard-copy for either the Apple Silentype or Trendcom 200 line printers.

DATA PLOT allows up to 99 points to be plotted on all but the pie chart, which only supports a maximum of 25 points. The program automatically scales the charts for the user, but this feature can be disabled. Multiple charts are allowed and labels in addition to your axis labeling may be added to give your charts a finished look. However, these extra labels can't be saved as part of your data file, but can be saved as a finished Hi-Res picture.

The program also offers a statistical package. A simple keypress will show the mean and standard deviation of the data points on your bar charts, scatter diagrams and line graphs. Likewise, percentages are given for the slices in your pie charts.

The program comes on a protected 3.2 disk. Muse's protection scheme also produces a protected data disk. This precludes interfacing directly with the data files from any other program like "Visicalc". However, one can enter the data by hand. Another problem involves using a printer other than the two mentioned above. Although it may be possible to use Ctrl-C to get out of the program, then type in a driver program in hex and save it to the protected disk, Muse doesn't specify how.

The program is quite comparable to Apple Plot. Its editor is easier to use than Apple's and has the added feature of statistical computations. However, as mentioned above, it is restricted in interfacing directly to other program's data files.

TOPOGRAPHIC MAPPING PROGRAMS

Company: Apple
Language: Applesoft
Hardware Requirements: 48K

Department: Education
Sugg. Retail: $75.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	C	ERROR HANDLING	B–
EDUCATIONAL VALUE	B–	DOCUMENTATION	B	RELIABILITY	A
VENDOR SUPPORT	A–	VISUAL APPEAL	B	VALUE FOR MONEY	B–

TOPOGRAPHIC MAPPING PROGRAMS consists of a set of nine programs related to processing as well as displaying spatial data such as topo-maps. This package will work equally well on any data that can be displayed as a relief map. This feature makes these programs interesting to students of demographics, ecology, or a science that produces data which can be displayed as a continuous function in three dimensions.

The first two programs, REGULAR and IRREGULAR, convert the input data into a form usable by the other seven display programs. The user must enter data in the form of data statements inserted into these programs — one being used for map grids on even intervals, the other for irregular grid patterns. To use data statements in this way is most inconvenient and is the weakest part of the package.

Two programs, LAYER AND SLOPE, use the Lo-Res screen to user-specified colors for height or slope ranges, which are also user-specified. These two modules work well and produce the required display in a few minutes. The images cannot be stored to the disk or printer, however.

The remaining programs use the Hi-Res screen for display.

They are:

CONTOUR — which draws conventional topo-maps at user specified intervals. This can take 15-30 minutes to run.

INCLINED — which performs like CONTOUR, except the plane of contour intervals is tilted.

BLOCK — which produces an isometric view of the surface from above. Lines are drawn at equal intervals following the elevations, with the general effect produced of seeing a distorted chess board from above. The picture is completed in a few minutes.

PLASTIC — which uses plastic relief shading to produce a view that approximates the effect of light falling on a surface from a specified direction and angle. This takes about 10 minutes.

VIEW — which creates a perspective view with hidden line deletion.

This is the most sophisticated program in terms of sheer calculation. The manual states a 20-minute run time; however, this reviewer experienced run times in excess of 1 hour for several runs. If you enter a viewpoint below the view grade, the program will cheerfully proceed and take an hour to draw all that can be seen underground.

None of the Hi-Res images can be stored. The manual states that with the given program modification, these Hi-Res programs can be dumped to an Apple Silentype; this was not tested.

The programs do all that is claimed in the manual. The group of mapping methods is unique in its level of sophistication. Those with an immediate mapping display requirement should do well to look at this package. For teaching or entertainment, this system is too slow to maintain one's attention, such as it is. Making slides of the various displays would be more practical.

GRAPHICS PACKAGES & SHAPING TABLE PROGRAMS

GRAPHICS MAGICIAN

Company: Penguin Software
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $59.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	A
VENDOR SUPPORT	B+	ERROR HANDLING	A	VALUE FOR MONEY	A

The *Graphics Magician* is an outstanding and creative graphics package written by three gifted programmers, Mark Pelczarski, Chris Jochumson, and David Lubar. They combined their expertise to produce a series of editors and machine language routines that will allow the intermediate BASIC language programmer to produce arcade style animation in his games or Hi-Res drawings for use in his adventure games. The philosophy is to have the users treat the graphics routines as a mysterious black box that can be controlled by several input parameters from a BASIC program. While a minimum of explanation is provided to aid the user in his choice of which black box might work best.

There are three main parts to this package. The first is the animation package. This consists of three editors: the shape editor, the path editor, and the animation editor. The shape editor allows you to create a set of seven shifting shapes that if moved across the screen horizontally would produce very smooth animation. When shapes are drawn using the I, J, K, and M keys for cursor movement and other keys for locking and unlocking the plot and erase modes, seven shape tables are generated on the screen simultaneously. Any one or several at once can be drawn independent of the rest of the shapes. Therefore, the motion of a man walking could be drawn in seven stages. The body and head would be drawn first for all seven shapes, then the arms and legs independent for each frame. These shapes can be in color if color rules are followed in what is an every other column color-alternation on the Apple's Hi-Res screen. Shapes are then compiled into bit-mapped shape tables, and if the user wishes he can then watch his animated shape as it moves across the bottom of the screen.

Once you have created a shape, you use the path editor to tell it how to move on the screen. Eight keys decide the direction, and the size of the move can be as large as three units in any one direction. Since each direction move uses one memory byte, a long and complicated path could use a lot of memory, especially if you are planning several dozen shapes in your game.

The animation editor allows you to combine as many as 32 shapes with their associated paths. You can specify the starting coordinates for each shape and can use the same shape a number of times. There are other options that will allow you to stop an object or erase it from the screen when its animation cycle is over, or loop back and continue another cycle. Also, the user can preview the animation before saving it to the disk.

The picture/object editor allows you to create colored pictures and objects in a form that takes amazingly little space in memory or on the disk. While pictures normally require 34 disk sectors, the average space required is only 2 or 3 sectors, and a very complex picture only 5 sectors. These pictures can be used from your program using a BLOAD, two POKEs, and a CALL.

Each move that creates your picture requires memory. A byte counter is displayed at the bottom of the screen. A line can be drawn in your choice of color by setting a start point with paddle button one, then drawing that line to another point by pressing button 0. The user can choose any of 108 colors from a pallete of colors and fill in any closed boundary with that color. Of course, most of these colors are checkerboard combinations of the six primary apple colors. It is often best to use a non-spring loaded joystick when positioning your cursor. And more accurate control is offered allowing more controllable motion over a narrower range. The program also incorporates an editor that will allow you to step through your drawing procedure. Thus, mistakes can be corrected or instructions added and deleted without having to start over.

The third part of the package allows you to create super shapes which are very similiar to Apple shape tables but with added features. Since scale and color can be changed in the middle of your shape, large shapes can be condensed in memory by using a larger scale. You must realize that using this procedure is much slower than using bit-mapped shapes developed in the first section of this graphics package.

THE COMPLETE GRAPHICS SYSTEM

Company: Co-Op Software
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $59.95
Availability: *
Disk or Tape: Disk

OVERALL RATING	A–	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A–	VISUAL APPEAL	B+	USEFULNESS	A
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A–

This graphics package is an impressive group of utilities that creates and draws Hi-Res pictures, creates shape tables, edits character fonts, allows text to be added to your pictures, and allows you to create and manipulate 3-D figures. It performs some of these functions exceptionally well, while others only just adequately.

The 3-D graphics module is extremely versatile. First, it is intended only to create, view and manipulate figures. These objects cannot be used in other programs for game design. Its best use is for viewing 3-D objects from various angles and then saving them as Hi-Res pictures which can be later colored. The graphics editor is very easy to use for entering, changing or adding points and their associated line segments (e.g., Point 2 to Point 4).

The 3-D objects can be rotated about the center in any plane, or about any particular point as the center. Any axis can be distorted or any individual point can be moved independently of the rest of the object. Objects can be scaled or viewed from close up or far away. Line clipping is performed. One can also add several smaller objects to one graphics file. They also include a utility that would allow one to make individual sections of a 3-D object and put them together in one complete 3-D picture.

The shape table creator produces very easily defined shape tables. One can move or plot a shape by paddles or keystrokes in a defined size shape. The algorithm creates a shape table from the entire block. Although this method is easy for beginners, it creates overly-large shape tables. Drawing a shape which has much empty space around itdestroys too much background on the Hi-Res screen.

The font editor for small and large letters is nicely implemented. One could define an entirely new character table and then place these characters or shapes anywhere on the screen. The character generator can be saved into one's own program.

THE COMPLETE GRAPHICS SYSTEM's drawing program for Hi-Res pictures is the weakest module on the disk. Although it has a nice auto-fill mode in some 100 color shades and it can easily draw line segments using paddles, it lacks the ability to quickly draw geometric shapes such as parallelograms and triangles. (See E-Z Draw.) However, it can do circles and ellipses. The program has a paint brush mode of various widths.

Overall, THE COMPLETE GRAPHICS SYSTEM is an impressive package. The documentation is thorough and easy to understand. If one is fascinated by manipulating 3-D objects or one lacked several of the appropriate utilities, it will be a good value.

PASCAL ANIMATION TOOLS

Company: Apple Special Delivery
Language: Pascal
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $75.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	C+	USEFULNESS	B
VENDOR SUPPORT	C+	ERROR HANDLING	A–	VALUE FOR MONEY	C

The Graphics Editor is very easy to use, since it is a direct copy of the editor used in Apple Pilot. This is a character/animation generator which allows the user to create characters in a 7 by 8 dot matrix. The program also allows the user to connect characters in order to form a larger image consisting of a 7 by 6 character-size matrix (i.e.: 49 vertical dots, 48 horizontal). By "hooking" these images together quickly, the picture seems to move and thus produce an animation effect. For anyone who wishes to save time in generating graphics and animation, this is a good buy. The package includes demos with source code instead of extensive documentation (which should have been included). Also, I believe Apple could have "prelinked" the new library functions included in this package. This would have avoided having the user link-edit a program every time it is run.

ARCADE MACHINE

Company: Broderbund
Language: Assembly Language
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $44.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A+	DOCUMENTATION	A	RELIABILITY	A
EASE OF USE	A+	VISUAL APPEAL	A–	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	A

The ability to create or customize a fast-action arcade game is beyond the programming abilities of the average Apple II owner. Even with the help of several good texts on the subject, good assembly language programming skill, and the patience of Job, it is a formidable undertaking. Broderbund comes to the rescue with a new graphics package called *The Arcade Machine*. This program generator designs a type of arcade game known as the shoot-'em-up. A user can design and customize an old classic arcade game like *Galaxian*, or use his imagination to design something new and unique. Best of all, it offers valuable insight into how a game is designed by having you design one yourself.

There are several factors that make this outstanding program an easy and fun one to use. It is entirely menu driven, requires no programming ability, and displays results immediately. In addition, *The Arcade Machine* offers considerable flexibility in allowing the user to incorporate nearly all of the features that he has seen in commercial shoot-'em-up games.

Since designing a game requires attention to a tremendous amount of detail, the author has resorted to the tutorial approach using a working game as an example. The user is encouraged to modify a sample "space invasion"-type game that the program defaults to upon bootup. Although the modification options are nearly endless, they begin with the altering of shapes. There can be as many as 24 different enemy shapes on the screen. These shapes are organized in four groups called blocks. Each block consists of six small objects. or three medium sized objects, or two large objects. In addition, there are shapes for tanks (player controlled ships), and explosions. The menu controls the sizes and types of shapes, and displays these in a chart.

Editing of shapes is similar to that used in the author's *The Complete Graphics System*. A series of seven boxes, one each for the seven shifted shapes, is arranged on the screen. Drawing takes place by keyboard cursor control simultaneously on one or more active shapes. Thus, objects can be animated as they move horizontally across the screen by changing one or more of the shapes slightly. NOTE: Animation does not work vertically on screen using this approach. Shapes can be drawn using any of the six Hi-Res colors. Also, different shapes can be activated for each of the five game levels.

Probably the most enjoyable feature of this program is the path creator, which animates your shapes and then lets you run the game option to watch the results. Ten different paths, each containing 254 instructions, may be programmed. This does not restrict the ten objects to ten paths. Each object is assigned to a particular path, and there are conditional jumps that allow an object on one path to jump to the same position in the next higher numbered path.

The paths are programmed on a screen with a keyboard controlled crosshair. Each of the objects following a particular path has an initial starting position. These are set later while choosing the level options. Two outer rectangles show screen boundaries, one relative to the other. Each move with the cursor programs the shape to move a set distance at a fixed rate of speed. Both these parameters can be varied initially and during the programming. Shapes can also be instructed to drop a bomb in a particular direction when they reach a set point in their path, or transform to the next higher numbered shape when they reach that point. Additionally, a shape can remain stationary while objects perform up to 30 extra instructions, or they can make a conditional jump based on the position of the player's tank. Insert and delete commands let you edit the path. The commands in the path table can be viewed individually, backwards, or forwards, with the use of the arrow keys.

Game variations can be set with the game options. For instance, a game can be played with either one or two players (two player games cannot have joystick movement). You can also include a time limit, barriers on the bottom that will be eroded when struck, bouncing bombs, random object bombing (an alternative to setting bomb drops while programming the path), and have the objects explode when they hit the bottom of the screen (useful in a game where you must catch falling objects). Sound effects can also be changed. They can be customized for duration, pitch, and frequency. Scoring point values can be selected for each type object and for each level. Finally, you can position your object at its starting point in the path table. This is extremely important if you are designing a winding path where objects that start in different screen positions follow each other. If objects start their paths at different places in the path table for each level, the game, as you can imagine, will look substantially different on those levels.

An insight into this program's versatility can be had by choosing "Level Options" from the main menu. Several parameter charts are displayed for editing. One includes the values for star movement, speed, density, tank speed, movement limits and accuracy, missile speed, type, number and drift, and bomb speed and type. These can be adjusted for each of the five levels. Under "Miscellaneous" is another option page that allows you to choose items like smart bombs, steerable missiles, free tanks, and whether or not missles should stop when they strike a background object with the color "White 1."

Once a game is completely designed and the background and title screens have been created, it can be saved to a data disk. Data for parts of a game can be saved at any time. But once an entire game is completed, you have the option of generating a bootable game disk that does not require *The Arcade Machine* program. Imagine the surprise of your friends when a game is played that is new and different and has your name on the title page.

The documentation is clear and concise. The 38 page booklet explains each of the menu options, and a limited tutorial helps to get the beginner started by re-programming the sample game. Five other example games, which can be loaded from files on the reverse side of the disk, show the versatility of the program.

The wondrous thing about this program is its ease of use and immediate feedback in viewing your creation. Programs can be created piecemeal, or carefully planned. They become immediately playable. There is little frustration in designing a game, and although the program is extremely versatile, it produces games of a set *type*. Don't, however, expect it to be able to generate maze games, or even games that are commercially saleable. Yet with your imagination, it can help create games that are different, fun to play, and best of all, uniquely your own.

HIGHER GRAPHICS II

Company: Synergistic Software
Language: Integer & Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $35.00
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B+	DOCUMENTATION	A–	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	B	USEFULNESS	B+
VENDOR SUPPORT	B	ERROR HANDLING	A–	VALUE FOR MONEY	B

HIGHER GRAPHICS II is a Hi-Res graphics development package for creating shape tables and editing them. It also includes a program called Screen Creation, which allows the user to create a detailed Hi-Res background screen that incorporates a combination of line drawing, in addition to shapes from his tables and text on the screen. HIGHER GRAPHICS II is a significant improvement over the original package introduced over a year ago.

The Shape Maker allows one to develop a shape table for use in one's programs, by either adding shapes to an existing one or starting a new one. Highly detailed or complicated shapes can be drawn in larger scales or any color so that errors are exaggerated. Plotting is done with simple U, D, L, R key procedures (up, down, left, right) and the P key for toggling on or off. One can edit the shape by erasing the last byte. For comparison purposes, other shapes can be displayed while drawing a new one and undesirable shapes can be deleted from the table at any time.

The Shape Shuffler allows the user to make a new shape table from a number of existing tables or add shapes to an old table. It does this by loading any shape table into Table 1 and allowing transfer to Table 2. It also allows the shape for Table 1 to be inserted into the middle of the Table 2. One can display any of the shapes in either table with the appropriate color, scale and rotation or all of the shapes (50 at a time) of either table.

The Screen Creator is an excellent tool for producing Hi-Res displays ranging from game boards to business charts. One can combine lines, shapes and types. For adding text, one can type directly on the screen with any scale, color or rotation, at a starting point specified by the game paddles. Lines can be drawn by button control or by continuous control (etch-a-sketch). Likewise, shapes can be added to the screen at any position, with any color, scale or rotation. If one needs to choose which shape from the table, the second Hi-Res screen is used for instant display. Also, shapes can be positioned and moved about on the screen without affecting the background before actually permanently adding the shape to your display.

The author has taken considerable thought in preventing the user from making blunders that would lose the programmer's newly created shape tables or screens even if the program crashed (from, for instance, a I/O disk drive error). In fact, even if that would happen, the program could be reentered with a GOTO 10000, with all shapes and tables intact. Also, since single keystroke commands could cause the undesirable effect of erasing a shape table or screen, all such commands can be aborted with the ESC key.

The program is extensively documented with clear and readable instructions. It explains how one uses Hi-Res shape tables in Integer and Applesoft programs and discusses where tables are best stored. It also includes a set of Hi-Res routines for Integer machines lacking a Programmer's Aid chip.

This program is very well thought out with documentation that provides helpful advice in using the system.

THE SHAPE MAGICIAN

Company: Dynacomp
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $29.95
Availability: 7
Disk: Disk

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	B–
VENDOR SUPPORT	C	ERROR HANDLING	A	VALUE FOR MONEY	C+

THE SHAPE MAGICIAN is a graphics utility program that facilitates the construction of shape tables. While there are many commercial packages that do this, the SHAPE MAGICIAN has some advantages as well as some limitations over others.

The author has defined a grid — an oversize plot pad 25 units per side — for accuracy in plotting a shape. One can use the cursor for plotting or not plotting in any direction using simple keystrokes. Mistakes can be corrected by backtracking through as many vectors as one wishes with an asterisk keystroke. The program's algorithm allows one to travel upwards in the non-photo mode without regard to the rule that you can only move two spaces without moving sideways before continuing. While one plots on this 5X scale grid, a normal size shape is displayed in the upper right hand portion of the screen. The number of bytes used is displayed on the lower right side of the screen. The program limits you to 30 shapes per table. A shape's size cannot exceed 150 bytes or 300 vectors. Of course, one is limited to a shape not larger than 25 units by 25 units.

The program has an editor, but it isn't suitable for constructing a new table — just for either redrawing a shape or adding new shapes. The feature for redrawing a shape comes in handy because it leaves you with the cursor exactly where you finished; thus you can use the asterisk key to backtrack to correct your shape. You can even erase the shape completely and start over.

The program is very handy for constructing complicated yet accurate shapes that you have plotted on graphic paper. Its documentation and screen layout is very clear.

ALPHA PLOT

Company: Beagle Brothers
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $39.50
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	B	VISUAL APPEAL	B	USEFULNESS	B–
VENDOR SUPPORT	B	ERROR HANDLING	A	VALUE FOR MONEY	B

Alpha Plot is a Hi-Res graphics utility package that creates colorful drawings combined with text. It resembles many of its competitors' packages, with two important differences. Images or parts of a screen can be merged with another located on Hi-Res page two; and the program adds true, proportionally spaced text that can be placed anywhere on the screen. This means that you are not restricted to the usual character position placement, and that you can start the next character by overlapping the last, or part of a previous character row.

The drawing mode allows you to quickly plot lines, dots, boxes, and ellipses. (A circle is a special case of a round ellipse.) These shapes can be drawn in any one of the six available Hi-Res colors. The shapes can also be filled with a color, and this may contain a mixture of two Hi-Res colors. The working cursor for performing these operations can be controlled by either keyboard or paddles. When using the keyboard mode, the speed of cursor movement, or the number of pixels the cursor moves can be selected. The cursor in a normal mode forms a box from the initial position, or it can act as a rubber band cursor, showing a stretchable, projected line. The latter is helpful for viewing the line before you actually draw it.

The text mode can be in upper or lower case. Letters are proportionally spaced and you may vary the leading or spacing between letters. Type comes in four type sizes, with larger type in color. Type can be placed sideways for labeling graphs, or even typed upside down for a mirror effect.

Alpha Plot has several merge features that allow portions of Hi-Res screen #1 to be merged with Hi-Res screen #2. The merger can be done in four ways. Images can be ORed, XORed, ANDed, or compared/combined. Each method produces an entirely different effect, and experimentation is advised. Portions of pictures can also be relocated or duplicated within a Hi-Res screen. Of course, all creations can be saved to disk.

Alpha Plot is certainly a versatile product, and one that is easy to use. It has features that some packages don't have, yet lacks others. It is clearly documented and works well with another of their Tip Books. The package also includes a picture scruncher that allows pictures to be compressed on the disk to save space. The graphics package is a good value.

HI-RES SECRETS

Company: Avant-Garde
Language: Applesoft & Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $125.00
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	D	DOCUMENTATION	D–	RELIABILITY	B
EASE OF USE	D	VISUAL APPEAL	C–	USEFULNESS	C
VENDOR SUPPORT	C	ERROR HANDLING	C	VALUE FOR MONEY	F

HI-RES SECRETS attempts to unveil the clandestine aspects of fast Hi-Res shape animation using the techniques of block shapes (raster graphics) and Hplot shapes. The package also includes routines involving scrolling, color fill, music and sound, and a superfont character generator.

The package consists of a 260 page loose-leaf book and 4 disks containing both LIZA-compatible assembly language source listings for the programs discussed in the book and utilities to aid your shape generation and animation. Two of the disks are unprotected and two are protected. This does create some problems, in that there is a proper sequence in transferring files created by utilities on the protected disk to unprotected disks. And since there are so many small programs on the disks, the author's introduction to various sample programs can leave you somewhat breathless and confused.

The author assumes that his audience is Applesoft programmers and that they would choose to access the routines directly from that language. Therefore, he opts for a convention that is convenient for the BASIC programmer but is non-standard for block-shape machine language animation, particularly as is done in arcade animation. The author clearly states that this is his preferred method. While Hplot shape animation has no set convention since no one uses it for animation, block-shape animation is too important a subject to be left to the whims of an author who feels that animation consists of cartoonish figures resembling little people walking across the screen.

The book presents the three types of shape routines used for animation. Vector shapes, which are Apple shape tables, are glossed over since what one really needs to generate them properly is a shape table generator, which isn't included on the disk. Why? Because every few pages the author mentions that what one needs is his SUPER SHAPE DRAW package which he created. This costs an additional $40. The fact that you have paid for this package is no consolation. His presentation for Hplot shapes is much clearer and his method is satisfactory. I think programmers will have no trouble with it if they plan to use it in their programs. Except for some special cases, these shapes are rarely used, since they access the Applesoft Hi-Res routines directly.

The block-shape routines, as this reviewer mentioned, are non-standard. However, they do work. The presentation is not very clear and the book does not spend enough time unveiling the mysteries of the screen clearly. In fact, the entire text is at times very muddled and consequently very difficult to follow. The source listings for the assembly language routines do not contain comments in the listing; the comments are instead listed in pieces on the several pages which follow the source listings. One has to constantly flip back and forth between the pages in an attempt to follow his code.

The disks contain numerous examples and utilities. One can convert Hplot and vector shapes to block and Hplot shapes and block shapes back to vector shapes quite easily. There is a utility for generating block shapes and one for viewing shapes saved as a text file. There are also numerous shape tables on the disk for demonstrating how shapes are animated by moving sequences of them across the screen (e.g., people walking). Both single screen and dual screen examples are shown for smoothing animation. There are programs that scroll the screen and those that generate color fill within any enclosed shape boundaries.

The highlight of this package and its main redeeming feature is its color fill routines. Although they aren't capable of filling oddly-shaped areas completely from an inital single starting point, they are fast. Any enclosed space can be filled with multiple starting points. There is also a utility to double the width of the lines in any Hi-Res drawing. Disk #4 contains the entire set of color fill algorithms in a menu-controlled package. Advanced programmers who may want to incorporate the color fill routine in their adventure progams should try to understand the author's algorithm or at least learn how to use it directly. It, like the rest of his routines, is documented, although described in his usual vague writing style.

Overall, this package is more suited for beginners than advanced programmers who would like to learn arcade programming. Its major drawback is that it is difficult for beginners to follow. The routines work if one uses them in a cookbook fashion, and they can be accessed either from Applesoft or machine language. But I think these graphics routines will remain a puzzle to most readers. The package is certainly not worth the price.

E-Z DRAW 3.3

Company: Sirius Software
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $49.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	DOCUMENTATION	B	RELIABILITY	A–
EASE OF USE	B	VISUAL APPEAL	B+	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	A–	VALUE FOR MONEY	C+

E-Z DRAW 3.3 is an improved version of what was one of the best graphics packages available for the Apple II. It allows the user to easily create Hi-Res pictures using a combination of lines, geometric shapes and text. In this case, the text has been enhanced by incorporating Aldrich's Higher Text and adding several additional type fonts for large character sets. One can switch from graphics to text by a simple keyboard toggle at any time.

The documentation for the program is a tutorial that guides one through the steps of first drawing simple lines from one defined point to another, then proceeding to rectangles, triangles, parallelograms, circles and even ellipses in any of the Hi-Res colors. One can stop drawing at any time to form arcs of circles. In this new version, they have eliminated the paddle controls because they were awkward and have replaced them with the I, J, K, M cursor controls. These can be set to jump from one to nine positions per command. This change was done for improved accuracy.

Some unique features have been added to the package. One can now save a portion of the screen defined by any rectangle to the disk for later use in other Hi-Res screens. The move feature that allows you to move a rectangular-defined block anywhere on the screen and thus duplicate that area has been retained. It has a handy feature that allows the entire screen to be scrolled if the image is large enough. One disadvantage of the system is that if the user were just moving a small area, the original remains and one would have to paint it out by drawing a rectangle of the same background color.

The program also allows you to define an area, make a mirror image of it, slant it left or right, rotate it 90° or upside down and expand or compress it either horizontally or vertically. The program uses page two as a buffer so that if one doesn't like the results, he can restore the original. Of course, any drawing can be saved to the disk at any time and the screen can be dumped to a Trendcom or Silentype printer.

Sirius retained the calibration command involving working on another scale, plus a command that will calculate the distance between any two points. Unfortunately, they deleted what this reviewer considered a very handy feature in the original package: the X-Draw mode. This option allowed you to position a line to see how it looked before actually permanently drawing it.

The publisher has offered to update one's old E-Z Draw at a reduced fee. Overall, the new version is better. If one has switched to DOS 3.3 or needs enhanced text included in their pictures and doesn't already own Higher Text, updating their old package should be considered.

SHAPE BUILDER

Company: Telephone Transfer Connection
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $25.00
Availability: 6
Disk or Tape: Telephone Transfer (Disk)

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B+	VISUAL APPEAL	C	USEFULNESS	B–
VENDOR SUPPORT	B+	ERROR HANDLING	A–	VALUE FOR MONEY	C+

SHAPE BUILDER is a graphics utility program that simplifies the construction of shape tables for use in Hi-Res graphics programs. Although there have been a number of good programs that allow simple construction by keyboard movements of up, down, right and left, and a choice of plot orno plot, this program has added a number of features.

The cursor's plotting position is displayed at the bottom of the screen and one can simply specify a move to a particular position to continue plotting. One can start at a position, specify movement of say 20 units any direction and it will automatically draw a line there as part of the shape. The same is true for vectors at an angle. Likewise one can pick a point and radius to plot a circle. Of course one can back up to correct mistakes without starting over. The program also has a character set and any character in it can be saved to disk as part of the user's shape table. The program is self documented.

SHAPE EDITOR

Company: Telephone Transfer Connection
Language: Applesoft
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $15.00
Availability: 6
Disk or Tape: Telephone Transfer

OVERALL RATING	**B –**	DOCUMENTATION	**C**	RELIABILITY	**A**
EASE OF USE	**B +**	VISUAL APPEAL	**C**	USEFULNESS	**C +**
VENDOR SUPPORT	**B +**	ERROR HANDLING	**A –**	VALUE FOR MONEY	**C**

SHAPE EDITOR is the companion program to SHAPE BUILDER. It allows the user to edit unwanted shapes in his table or combine several shapes in one shape table with several in another. It also has the capability to add remarks about each shape for future reference. This file which is saved as a text file then can later be execed into the user's main program as REM statements.

3-D GRAPHICS

A2-3D1
Company: Sublogic
Language: Machine
Hardware Requirements: 32K

Department: Utilities
Sugg. Retail: $59.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**B–**	DOCUMENTATION	**C**	RELIABILITY	**A–**
EASE OF USE	**D+**	VISUAL APPEAL	**B–**	USEFULNESS	**B**
VENDOR SUPPORT	**C+**	ERROR HANDLING	**B+**	VALUE FOR MONEY	**C+**

Sublogic's A2-3D1 three-dimensional graphics package uses true machine language algorithms to draw and project objects using a 3-D graphics data base onto a two-dimensional television screen. It is the only package that defines all of the objects within the data base in relation to each other. Essentially, each of the object's points are defined in precise X,Y,Z locations, while the user's viewpoint is moved around an X,Y,Z coordinate system environment. Objects tend to advance, recede or even rotate as one circles an object while viewing it with a specific pitch, bank, and variable heading. This approach to 3-D graphics lends itself to applications like flight simulators, architectural drawings, and even games.

The program is quite fast (approximately 150 lines/sec.). Obviously, frame rates are dependent on the user's driver software and the number of lines drawn on the screen during one frame. A2-3D1 includes smoothing techniques for allowing the ability to draw on one graphics screen while viewing the other (ping-ponging) and for accomplishing array smoothing. The latter does all its calculations and stores its projection data, including the option for clipping lines, before drawing to the screen. It is almost like dumping to the screen as opposed to forming an image a line at a time. Image flickering still occurs, but all the lines are on screen for the same amount of time. The viewer's frame of reference can be anywhere within (+) or (–) 32767 limits in any of three axis, with the user having full-circle freedom of pitch, bank and heading viewing. There is also a variable field-of-view command which changes the viewpoint to wide-angle or telephoto.

Data bases are generated with a utility called "Develop". Versions are supplied in both Integer and Applesoft. The program allows you to choose op-codes for either a start point, continue point, ray, etc., and to enter the proper values for the its X,Y, and Z positions. This is done for each data point and all objects in the database. The utility isn't very versatile since it lacks the ability to later edit, insert or delete data points. However, it does offer a view function that allows one to see what is created. It is not interactive, although one can move the eye position for better viewing. When finished, the data bases can be saved to the disk for later use.

The most difficult and crucial step in working with this program is implementing a machine language or BASIC driver program. The driver is actually an elementary program that moves the eye around the data base, while adjusting its coordinate position, pitch, bank, and headings. One simply pokes values into the memory locations for the eye and then calls the 3-D package. The view as seen by the moving eye produces the screen animation.

The documentation leaves a lot to be desired. It is very complete but lacks clear explanation of how to implement many of its functions. There are actually two manuals. The short "Load and Go" manual tells how to use the "Develop" package and offers several BASIC program examples as drivers. The main documentation is a reference manual which details the program's main functions and all its op-code structures. It is better suited to machine language programmers; definitely not for beginners.

This is an extremely powerful graphics package. It offers more flexibility than its competitors' products. It lacks several useful features; however, these have been added in the A2-3D2 enchancement.

A2-3D2

Company: Sublogic
Language: Machine
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**B**	DOCUMENTATION	**C+**	RELIABILITY	**A–**
EASE OF USE	**D+**	VISUAL APPEAL	**B**	USEFULNESS	**B**
VENDOR SUPPORT	**C+**	ERROR HANDLING	**B+**	VALUE FOR MONEY	**B+**

Sublogic's A2-3D2 package is an enhancement of their original A2-3D1 package. It offers two substantial changes: 1) five color graphics plus twice the resolution in the black-and-white mode and 2) independent object manipulation. It also frees the memory constraint of the 32,767-byte environment from the consequential inherent overflow which occurs when the graphic's values are rotated and exceed the limit.

The ability to perform independent object manipulation is this package's greatest strength. One isn't limited to sixteen objects as in the competitive packages; therefore, the user may multiple-call or even nest the objects. When objects are nested and then rotated on their axis, other attached objects also rotate in unison. The independent object, which is defined as a block, is called by an op-code in the data base. This op-code contains the location of the independent objects' coordinates, plus its pitch, bank and heading. It also includes a countdown feature, so that if, for example, it were a photon torpedo, it would disappear after so many screen cycles. Thus, an object could be moved around the screen by a BASIC program which poked new locations into that calling op-code. This can be done simultaneously while your viewing perspective is moved independently within the 3-D data base or world.

To state that the package is powerful is a mild understatement. It is approximately 10% faster than the previous version while operating in the normal B & W mode. The documentation is thorough (but difficult) for beginners. This system is supposed to be combined with the A2-3D1 package to work but, in fact, it works by itself. However, there are important points that are referenced only in the original package's documentation; thus, ownership of both versions is suggested.

A2-GE1 GRAPHICS EDITOR

Company: Sublogic
Language: Assembly Language
Hardware Requirements: 48K

Department: Utilities
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B**	EASE OF USE	**B–**	ERROR HANDLING	**B**
EDUCATIONAL VALUE	**B–**	DOCUMENTATION	**B+**	RELIABILITY	**B**
VENDOR SUPPORT	**C+**	VISUAL APPEAL	**B+**	VALUE FOR MONEY	**B+**

A2-GE1 Graphics Editor is a utility package for creating and manipulating three dimensional data bases that use the *A2-3D1/A2-3D2* graphics packages. It includes an Object Editor program, a Motion Programmer, and a Slide Show Programmer. The latter two make previously created objects and scenes, manipulate them, and later play them back as either movies or slides. Also included in the package is a BASIC interface which illustrates how one can control an *A2-3D1/A2-3D2* data base from a BASIC control program.

The Object Editor is an interactive editor that allows users to construct three-dimensional data bases while viewing them. The user controls a cursor that moves in three dimensional space on the Hi-Res screen. Four lines of text at the bottom give the cursor's current coordinates and the type of data base command entered. The user can position the cursor, continue point, or ray. The cursor is moved using the X, Y, and Z keys; and is decremented or incremented from its last position. Likewise, the location of the user's eye can be changed by first toggling into the eye mode, then incrementing or decrementing the eye's position. All mistakes in the data base can be corrected by scrolling backwards through the data base using the arrow keys. One must be careful to change the proper data point, or the entire data base could be lost, requiring data to be re-entered from the initial processing phase.

The Object Editor, while easy to use for people who have trouble visualizing three dimensional objects, has several drawbacks. It is not suitable for entering large, predefined databases. Nor does it have delete or insert capabilities, and it is unable to use the *A2-3D2*'s powerful commands such as independent object call, page switching, or array generation, to produce a smoother, flicker-free picture. It does, however, use the color features, and can set the resolution of the picture.

The Motion Programmer allows one to load up to six object data files and manipulate them, each independently of the other. This is accomplished through the independent object call feature of *A2-3D2*. One object must remain stationary, but the others may be given arbitrary velocities and rotations along the axes. This is done interactively as you view the objects, and thus is great fun. Assuming you mastered control of all the objects, the motion recorder feature of the program can be turned on. This will record the entire session much like a video recorder, and can be played back later using the MPLAY program on the disk.

The documentation, which was one of the weaker points of the first two packages, is well-written, for once. It is directed towards the beginner. One of the most helpful sections, that makes up for deficiencies in other packages, is the description of the BASIC interface to the *A2-3D2* package. It explains how objects that are created by the Object Editor can be loaded into memory, and animated under control of a BASIC program.

While this graphics editor is a great help and is easy to use, it lacks the important features of a true data base editor that would allow the user to unlock the potential of the *A2-2D2* graphics package. Hopefully, a future version of this package will include a true database editor.

APPLE WORLD

Company: United Software of America
Language: Assembly
Hardware Requirements: 48K

Department: Graphics
Sugg. Retail: $59.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	C+	DOCUMENTATION	C	RELIABILITY	A–
EASE OF USE	C	VISUAL APPEAL	B	USEFULNESS	C+
VENDOR SUPPORT	C–	ERROR HANDLING	B	VALUE FOR MONEY	C

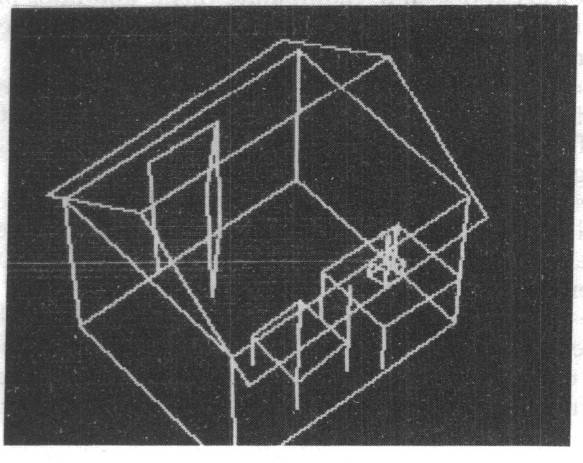
APPLE WORLD is a three-dimensional graphics package especially useful in architectural design and for animation. The package is capable of showing three-dimensional objects in a predetermined series of moves specified in advance by the user. The boundaries of this system is a cube about 64,000 units on a side.

The program is relatively easy to use, as it virtually has a text editor for entering data that makes it simple and the program avoids forcing you to understand any technical aspects.

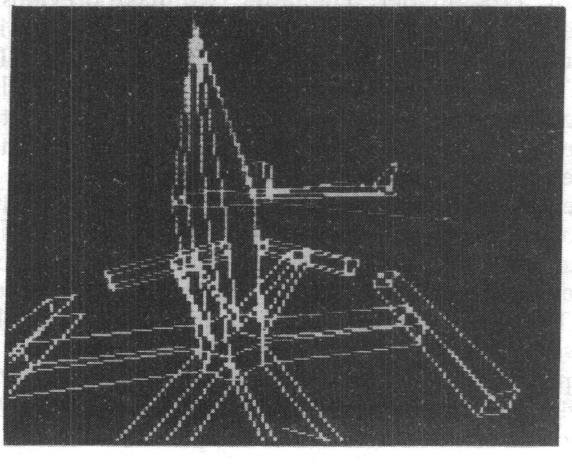
Data is entered by specifying a start point for the object in X, Y, and Z coordinates, then a point to continue that line in relationship to the previous point (ex. +100X, −10Y). Once an object is completed and entered, one can view it by specifying a scale, a viewing position, plus angles (both horizontal and vertical) to point the viewfinder at the object.

Created objects can be saved for later animation or can be used as basic building blocks for more complicated objects (e.g., chairs in a conference room). One can also save at any time the current view on the screen.

APPLE WORLD's main disadvantages are that the program lacks real-time interactive control such as an interface with the PDL input-output for game animation and, as the number of projected lines increases, the animation speed bogs down (speed is approx. 100 lines or points/sec.).



APPLE WORLD



A2-3D1

3-D SUPERGRAPHICS & GAME DEVELOPMENT SYSTEM

Company: USA Software
Language: Integer & Applesoft
Hardware Requirements: 32K

Department: Graphics
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C –	DOCUMENTATION	D	RELIABILITY	B +
EASE OF USE	C –	VISUAL APPEAL	B	USEFULNESS	C
VENDOR SUPPORT	C –	ERROR HANDLING	B	VALUE FOR MONEY	C

The 3-D SUPERGRAPHICS package by Paul Lutus is a tool for animating games or demonstration programs. It allows one to define 3-dimensional shapes either in black and white or any of Apple's Hi-Res colors. One can move these objects around the screen, rotate them about their X, Y, or Z axis, change the scale overall or stretch the shape by scaling the axis unequally. Supplementary text can be placed anywhere on the Hi-Res display in any scale or color.

The machine language algorithm for rotating objects using matrix transformations is quite fast. The technique of ping-ponging between two graphics screens provides flicker-free animation. Because of the extra calculations required during color display, the animation frame rate for large databases tends to slow down considerably. Lutus provides two versions of the program. The one in black and white is for faster framing. Of course, one wonders exactly how fast is his package compared to others like Budge's or Sublogic's. If the user's driver package is in machine code, then it's probably a toss-up between Budge and Lutus' B + W version. The color version is definitely slower. In Integer or Applesoft, Lutus' B + W is faster because he provides commands for executing loops within his code rather than the traditional FOR-NEXT loop. As usual, one has to be particularly careful with an object near the edge of the screen. This package has no line clipping; therefore, objects tend to wrap around near the edge of the screen. And for those users that need missile algorithms, there are none. One must also be aware that the package places 3-dimensional objects on a 2-dimensional screen. There is no Z axis. The effect of objects moving away from the viewer is accomplished entirely by scaling.

Lutus includes a graphics editor for entering values for the data base. It is not a very good editor; USA Software recommends using the editor in their sister product, "Apple World". They handily include a program for translating between the two packages. They do give a listing of the editor in this package for modification to suit the user.

To use and manipulate the created shapes with a Basic program requires print statements with a format of the following form.

```
ex. PRINT "%ND, NW, SH28736, SC5"
    PRINT "%PX10, PY52,  RY0TZ0SZ
```

which simply says: "Draw a new shape starting in memory location 28736, scaled to 5, postion it at X = 10, Y = 52 rotate around axis from 0 to 20 stepping Z. It may throw beginners at first but it can be learned.

The documentation, which is in a nice binder albeit poorly printed, is somewhat difficult to understand. In an attempt to write a sample program, this reviewer completely misunderstood the difference between translation and position as explained in the booklet. While positioning an object to a particular place on the screen was simple, when I tried to move it across the screen with the translate command loop, I wrapped the object around the center of the screen. Rereading the documentation didn't help, but a phone call to NYC did. Apparently, my definition of translate and theirs is not the same. In short, I found the documentation frustratingly difficult to follow. Even their demo with their multi-command structure was difficult to understand.

The disk is protected so that if one wants to use the package in his own program he will have to load the graphics package from the disk. If one wants to incorporate the package into a commercial program, he will have to arrange for a royalty use fee with USA Software. Unlike Budge's graphics package, commercial use of this one is not free. In summary this package has applications for game programmers, especially if they prefer their graphics in color. However this package is somewhat more difficult to understand and implement in one's own game design than the Budge package.

3-D GRAPHICS SYSTEM & GAME TOOL

Department: Graphics
Company: California Pacific Computer Co.
Sugg. Retail: $39.95
Language: Machine
Availability: 8
Hardware Requirements: 32K
Disk or Tape: Disk (Protected)

OVERALL RATING	**B+**	DOCUMENTATION	**B**	RELIABILITY	**A**
EASE OF USE	**B**	VISUAL APPEAL	**C+**	USEFULNESS	**B**
VENDOR SUPPORT	**C**	ERROR HANDLING	**A–**	VALUE FOR MONEY	**B+**

Bill Budge's 3-D GRAPHICS SYSTEM allows one to design a Hi-Res three-dimensional game with relative ease. The graphics editor enables the user to create up to 16 different 3-D shapes and view them. This database is then saved to the user's unprotected disk. A machine language module that manipulates this data is also saved to that disk. All that the user has to do is write a game control program in machine language or either Basic language.

The graphics package is at least twice as fast as another package on the market. It ping-pongs between graphics pages to minimize flicker. It also allows one to mix text with the graphics and has missile algorithms to shoot an object down in 3-D (not available in Applesoft).

But speed has a price, and that price is no line clipping at the edge of the screen, so one must be careful to keep any part of the objects from ever crossing the boundary. Although each of the 16 objects are rotated in a true 3-D space, they are placed individually in a 2-D plane. There is no Z axis on the TV set. The actual appearance of an object coming at you is accomplished by changing the scale. The same thing happens when one shoots a missile. One is actually firing from one x,y to another x,y.

The package is excellent for game animation. Budge has well-documented instructions and a game example.

HI-RES SCREEN DUMPS

PRINTOGRAPHER

Company: Southwestern Data Systems
Language: Applesoft; Machine code.
Hardware Requirements: 48K, printer.

Department: Utilities
Sugg. Retail: $49.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B–	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B–	VISUAL APPEAL	B+	USEFULNESS	B–
VENDOR SUPPORT	C+	ERROR HANDLING	B–	VALUE FOR MONEY	B

The Printographer is a utility designed to dump the graphics screen to a printer or to disk as one of several formatted files. All popular printers are supported, and the program is supposed to work with any printer (although I could not test it with all). *The Printographer* will dump the Hi-Res screen, or some portion of it, to a printer. You select which section of the screen to be printed. In addition, there are two built-in formats: a cameo oval and a diamond. These formats can be superimposed as needed on whatever portion of the Hi-Res screen you have outlined.

When printing graphics, the program allows you to select a magnification power from 1 to 9. Routines are provided for your use in printing from programs that you write. In these, you may magnify the picture up to 127 times.

The program allows you to save the printing sequence to disk instead of sending it direct to a printer. This can be very useful if you wish to transfer a Hi-Res picture from one machine to another via a modem. It is also handy for "spooling" pictures to a printer while some other program is running, or at a later time when the computer is not in heavy use. My particular configuration includes an Apple II with Diablo printer driven by an Apple Serial card. The sequential file produced on disk for a small portion of the Hi-Res screen was 85 sectors long, versus 33 sectors for the complete picture as a binary file! If you use this option and a daisy wheel printer, be certain to have plenty of disk space open.

The Printographer will save any Hi-Res screen to disk in a compressed format (using the "S" file). This may produce a significant saving. But unless you have this or a similar program, you won't be able to recover those pictures. Perhaps in future revisions Southwestern Data Systems may provide a short stand-alone routine to allow you to recover compressed pictures in programs of your own.

The program generally worked well. One nice feature is the provision of the FPBASIC file on disk for those who have older Apples with 16K expansion cards. Another valuable feature is that the Page 1 Hi-Res screen survives the boot process. Normally, a Page 1 image is damaged during boot up. The program appears to do this by moving the picture to Page 2 during boot up, and then copying it back afterwards. Page 2 Hi-Res does not survive boot up.

Two features of this program did not work well. The menu indicated that one could shift between the Hi-Res display and the instructions by using the "?" key. This would not work. Once the Hi-Res display was brought up, the only way I could get back to the Help Menu was to exit the edit and re-enter through the menu which asked where the picture was to come from.

The second poor feature, and this was a more serious one, involved the difference between printing normal and printing inverse images. The program is designed to help you by examining the screen and determining for you if printing would be best as "normal" or "inverse." While its decisions may largely be correct, you never know for certain what the program has done until actual printing. There is an indication of what the program has picked, but it is not always correct. The simple fix is to display the screen exactly in the way it will be printed. This is quite easy to implement, and should be.

Although this is a good program, on the whole, it could be significantly improved with a little added work.

ZOOM GRAPHIX

Company: Phoenix Software
Language: Applesoft
Hardware Requirements: 48K

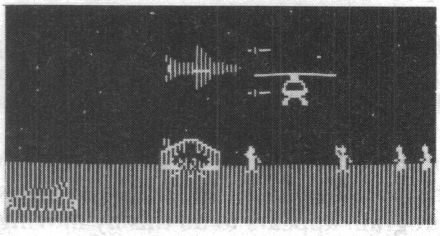
Department: Utilities
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A	DOCUMENTATION	B–	RELIABILITY	A
EASE OF USE	A	VISUAL APPEAL	A–	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	B–	VALUE FOR MONEY	A

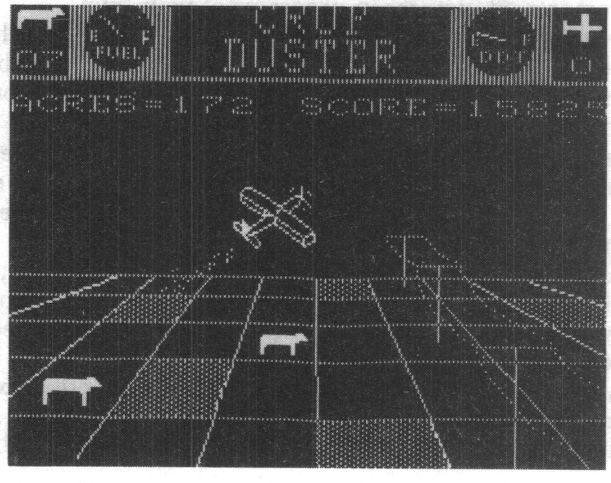
Zoom Graphix allows any printer that supports graphics to print out pictures that reside on either Hi-Res screen. It can print an entire screen either vertically or horiziontally; or print a portion of a screen in an expanded form or in your choice of screen proportions.

The program supports 21 printers. All of the Epson, IDS, and Adadex printers are included, as well as the Qume, Diablo, Xerox, Prowriter, NEC PC-8023, MPI 88G, Silentype, Spinwriter, and Starwriter. It will work with 20 interface cards virtually all that are currently available.

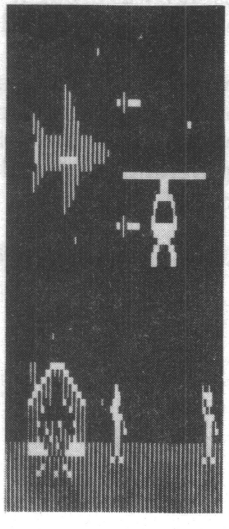
This utility is menu driven and it has excellent error trapping features. When a user wishes to print a portion of a picture, he can choose the coordinates of each edge, and the computer will show exactly what will be printed. He can easily change any value, or by hitting return, simply use the current setting of each boundary. The user can specify the proportions of the width and height relationship of the printing. A picture 2 dots high by 3 dots wide is the recommended setting, but one can stretch the width with a 5 dot wide by two dot high setting, or similarily squash the width with a 3 dot wide by 6 dot high setting. The program also incorporates a print delay at the end of each line so that print heads don't overheat when printing pictures with a lot of black areas. Pictures can be inversed if desired. There is no doubt that this is the most versatile of the many Hi-Res screen dump programs that are available for the Apple. The printing is certainly as dense and as dark as that offered by the Graftrix package, yet has many additional features.



PORTION OF PICTURE



NORMAL



ZOOM EFFECT

ZOOM GRAFIX

GRAPHTRIX 1.3

Company: Data Transforms, Inc.
Language: Applesoft and Machine
Hardware Requirements: 32K & Graphics Printer

Department: Utilities
Sugg. Retail: $75.00
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	B –	RELIABILITY	B
EASE OF USE	B +	VISUAL APPEAL	B	USEFULNESS	B
VENDOR SUPPORT	B	ERROR HANDLING	B	VALUE FOR MONEY	C

GRAPHTRIX is a graphics printer utility package that offers some new features unique to the microcomputer industry. This package is a menu-driven edition that implements Hi-Res screen dumps from either disk or memory (page 1 or 2) and supports all current matrix graphics printers used on the Apple II.

This package specifically can be used with the following printers: Anadex 9000/9001/9500/9591, IDS 440G/445G/460/560, Centronics 739, Epson MX-70/MX-80/MX-100, MPI 88G and the Silentype. The interface cards that are supported are: Apple Standard Parallel, Apple Centronics Paralles, Epson APL Standard, and the C.C.S.7728. The newest version incorporates support for the SSM AIO, Mountain Computer CPS, and the TYMAC (for Epson) interface cards.

GRAPHTRIX also allows Applewriter owners the luxury of placing graphics or pictures in their letter files, as well as inclusion of footnotes either at the bottom of the page or at the end of chapters. There are capabilities (if the particular printer supports them) for using three sizes of magnification, cropping of both top and bottom of screen, superscripting (with limitations) of footnotes, and a utility to quickly shift from one Hi-Res screen to the other. There are appendices for each printer manufacturer which provide information to the programmer for utilizing GRAPHTRIX capabilities in BASIC programs.

Error handling is accomplished by using Control-C for halting execution and re-running the program. Not very elegant, but effective nonetheless.

All in all, GRAPHTRIX is a most useful utility for the Apple owner who wants to fully utilize the graphics capabilities of his printer. The program is priced right and allows for easy backup, which is a blessing in this age of copy-protected diskettes.

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GAMES & ENTERTAINMENT

One of the more significant advantages of owning an Apple computer lies in the fact that the Apple has a dual personality. On one hand, the Apple is an extremely powerful personal computer quite capable of performing a variety of "practical" tasks. On the other hand, the Apple, due to its color and sound capabilities, is a "fun" machine. This section, on Games and Entertainment, deals with that facet of the Apple's character.

Games in general, especially during the last two years, have evolved from simplistic Lo-Res animation into lengthy integrated Hi-Res simulations and high-speed arcade-quality animation. The days when the Hi-Res screen was a mystery to all but a few and Lo-Res was the only viable alternative to the average game programmer have passed. Today's programmers are more sophisticated. They are totally aware of the Apple's capabilities. Their friends and competitors have provided challenges to them in setting new standards for game programming. Economic considerations have played a strong part in this process. The public, which has been spoiled by some of the best of the Apple game-oriented software and arcade game-playing experiences, is always looking for something better, new, and challenging.

Programmers who design games can be likened to writers creating works of fiction. There are hundreds of fictional books written each year, with perhaps only nine plot types. Regardless of how well they sell initially (whether they sell because they are different, the author is hot, or they are widely-promoted and/or have a flashy cover), few editions will sell for a period not exceeding a year; most will quickly fall by the wayside. However, a few will become classics and sell to newcomers year after year. In the computer world, only Adventure, Invaders, and Asteroids have achieved this rank. One sees inklings of new programs that might make it, but technology is advancing too rapidly. Even our classics may someday be considered too primitive.

Meanwhile, games are increasing in magnitude as programmers attempt to give the public something for their money. With game prices steadily creeping upward, how fast one tires of a game is becoming an important consideration, especially when games can no longer be traded because of protection methods.

Games are also becoming more graphics-oriented. The classic adventure type game now has graphics. Many games now include modules for creating or modifying the basic game to suit the players' tastes. Shoot-'Em-Up games have been enhanced by using true perspective, faster action and even 3-D effects. Very realistic 3-D games have been introduced. Programmers like Budge and Artwick have written games using their own graphics packages. These types of games may become the rule rather than the exception in 1982.

There is a potpourri of entertainment programs available today. The sheer multitude of titles might suggest that most people use their computer, at least in part, solely for fun.

As one can see from our table of contents, the programs are divided into 10 categories. Within any section, we have tried to group similar games together. We have attempted to show, in many cases, their differences. In some cases, grouping is based on whether one likes paddle controls versus keyboards or long games over short ones. And just because a game is in Lo-Res doesn't necessarily mean it is inferior. There are cases where Lo-Res is perfectly adequate and Hi-Res would not have improved it. A better criteria for evaluation may be whether a game possesses sound strategy and is playable (possibly even addicting) rather than how it looks. Finally, one should choose entertainment programs primarily on the basis of how many times he or she will use them.

As an overview of what our reviewers look for in evaluating game programs, as well as a tutorial for programmers developing new games, we are indebted to Mike Harvey, publisher of Nibble magazine, for allowing us to reprint his excellent article from Nibble, Volume 1, No. 1, 1980.

HOW TO WRITE GAMES THAT LAST

There's a very old story about the early use of computers to optimize complex mixtures — in this case, Cattle Feed. As the story goes, Government Researchers were searching for a Cattle Feed which would optimize everything. It would take very little land to grow it. It would have a short growing season, a high yield, a low cost, high nutritional value to the cows, and be able to be stored efficiently. The land was studied. The nutrition of various grains was studied. Farming techniques were studied.

After all the studies were completed, formularized, and fed into the computer, the system cranked out the recipe for the "Perfect Cattle Feed." Only one problem: The cows wouldn't eat it!

After considerable despair, head-scratching, and puzzlement, a young researcher made the wild-eyed suggestion that they consult a cattle farmer for the answer. After listening to the whole story, the farmer asked one question: "Does your feed have any Alfalfa in it?" The answer, "No," brought the reply: "Put in some Alfalfa. Cows will eat almost anything if it has Alfalfa in it."

The moral of the story is that technical perfection doesn't necessarily "fly" if the "Cows won't eat it." The same principle applies in writing and "Kid-testing" computer games.

This article is an effort to define the "Alfalfa" to make your games more fun and lasting, and interesting.

SET LIMITS! Even the most innovative game becomes boring if it goes on and on and on. If you're writing a shooting gallery, hockey, or some other game involving pieces which are used up during the game, limit the number of shells available, the amount of fuel for the flight, etc. Most kids quickly lose interest in the "process" if the process is all there is to it. Even better, set a combination of limits. If you have set a limited number of shots in a two-player shooting game without setting a countdown, eventually one of the players will lay back, waiting for the other to use up his shots. When the first player has used up his shots, the second will then fire at leisure and usually with more accuracy (a game playing strategy). This usually proves infuriating to the first player who throws the game control on the floor and storms out of the room (this has been "kid-tested" with my two boys).

The presence of the countdown timer, however, keeps both on their toes and involved every second of the game.

SET DYNAMIC GOALS! One of the tastiest "Alfalfa" game improvements is the PREVIOUS HIGH SCORE report. This is a very easy feature to install and it is a particularly potent addition to single-player games. Carrying the Previous High Score forward from round-to-round (of the game) gives a constantly rising goal to shoot for. Some kids also look on it as a way to test the "limits of the game." It allows the player to measure his/her progress and improvement in skill and will bring them back to play again and again.

MULTI-LEVEL PLAY! Most of your games can be structured for "Easy" and "Hard" play by inserting random variables that tend to draw the player toward disaster. Also, you may want to add a feature that automatically switches to the "Hard" version after some number of "Easy" games have been played.

LET THE APPLE COMPETE! Give your multi-player games the option to be played solitaire by having the Apple become the other player.

In having the computer compete, give it some elementary "smarts" to play a decent opposing game. You can program the game to shift probabilities dynamically to equalize the game as it progresses, or allow the Apple to seek out the closest target (to its shell) and then to automatically track to target.

MAKE YOUR GAME UNPREDICTABLE! Introduce random variables to throw the player off stride as he/she tries to "psych out" the game. In one of my early target games, I found one of my boys staring intently at the screen and rhythmically squeezing off shots which hit every target. He had a "feel" for the rhythm of the targets and was about to play for the last time. A random variable that required a "countdown" before the target reappeared, as well as a random pattern of "speed" changes in the target re-kindled his interest.

While you're inserting randomness, don't over-do it! If your game is totally random — that is, it lacks a Skill Factor — your players will quickly discover they are "Observers" and have no real control over the outcome.

KEEP THE ACTION FAST! I've seen my boys play "Break Out" (newer versions are being called "Little Brick Out") so intently that they hardly blink their eyes. The "Speed Effect" can be achieved in two ways. First, just physically make it run fast using the tips of your Applesoft or Integer Basic manual. Place the most frequently used subroutines and variables early in the program (each time you use a GOTO or GOSUB it must scan the whole program to find the Line #). Use multiple statements per line, 1-letter variables, Assembly Language subroutines, etc.

A second method for "speeding the action" is to introduce a lot of different player responses into a visually slow game.

Don't ignore the potential for programming ALL the slow graphics routines totally in Assembly Language. Depending on the type of program, an Assembly Language version may run 10-100 times faster than its Basic counterpart.

SET GREATER REWARDS FOR WINNING THAN LOSING! One of the seductive traps in game programming is to concentrate the creative effort in making spectacular explosions, etc. as you lose the game. If your game is too heavily weighted in this direction, you'll abort the very purpose of the game. The same principle is particularly true in another field, Computer Assisted Instruction (CAI). One of my early CAI programs found my sons eagerly making mistakes to bring out the computer responses and help statements — where their correct answers did nothing but go on to the next problem. Spend some effort to program Bonus Points, Extra Balls, More Shots, for exceeding different score thresholds and they'll keep coming back for more. Player "Evaluation" is a good technique to apply here. At the end of the game, evaluate the scores and bring out a "Player Rating" and you'll find the kids trying like mad to become a "Pinball Wizard," and "Admiral of the Fleet," a "Starship Commander," and so on.

Consider adding an "artificial" reward which exists for itself (i.e., doesn't really tie into the game). For example, you might program a Fireworks Display to the Winner; Play the STAR-WARS Music; Run up and down the Music Scale; "Flash-Print" your messages, etc. The possibilities are mind-boggling.

PLAN A GAME ANALYSIS/WRAPUP. You can keep game statistics as the game progresses. Then, at the conclusion, print out a summary analysis which shows "Who-did-What." This can include things like the number of shots taken; the ships hit (by type of ship, enemy or friendly, etc.); the number of first-downs; fuel used; and so forth. Not only will this tend to resolve disputes, it has even greater advantage in allowing the player to study his/her performance, the game itself, and the methods for improving the performance (to beat the PREVIOUS HIGH SCORE — which you added earlier).

CRITIQUE AND TUNE YOUR FINISHED PRODUCT. Many of the best computer games have "evolved" by repeated play and "tuning."

When you're working with a number of game variables such as the number of shots, countdown timers, etc. you'll need to inspect how they all work together. Then you should make adjustments to integrate them and make them consistent. To exaggerate the point, if you are allowing 50 shots to be fired at targets and your countdown fuel timer only allows 25 shots to be squeezed-off before time runs out, that's an obvious "Glitch," and is easy to change. But when you're going through complex evaluations of scores, reward messages, and the like, you should make sure that your "Top Reward" is actually ATTAINABLE by a skilled player — but not too easily attainable. Test it yourself and with other players. If the Top Prize never comes up, then the scoring should be re-tuned.

ASK FOR SUGGESTIONS! Above all, don't charge out of your study, drag in the kids, and say, "Play this new game. You're going to LOVE IT!" Kid-testing is very low-key and my boys have had tremendous ideas for improving game programs over the last couple years. Listen! And Tune!

TO SUMMARIZE:

- Set limits!
- Set dynamic goals!
- Program multi-level play!
- Let the Apple compete!
- Make your game unpredictable!
- Keep the action fast!
- Make wins better than losses!
- Plan a post-game analysis!
- Tune and re-tune your game!
- And invite suggestions!

You'll discover your programs are chock full of delectable "Game Alfalfa." The kids will love it!

ADVENTURE, FANTASY, SPACE and OTHER ROLE PLAYING GAMES

Did you grow up in the company of the Brothers Grimm, Snow White, the Red Fairy Book, Flash Gordon serials, the Three Musketeers, the Knights of the Round Table, or any of the three versions of the Thief of Bagdad? Have you read the Lord of the Rings, the Worm Ouroboros, The Incomplete Enchanter, or Conan the Conqueror? Do you enjoy Asimov? Remember Tom Swift? Have you ever wished you could cross swords — just for fun — with Cyrano or D'Artagnan, or stand by their sides in the chill light of dawn awaiting the arrival of the Cardinal's Guard? Ever wondered how you'd have done against the Gorgon, the Hydra, the bane of Heorot Hall, or the Bull that walks like a man? Would you have sailed with Sinbad or Captain Blood, sought passage on the Ship of Ishtar, or drunk of the well at the world's end? Did Aphrodite make Paris an offer you couldn't refuse? Would you seek a red-hued maiden beneath the hurtling moons of Barsoom, or walk the glory road with "Dr. Balsamo," knowing it might be a one-way street? Have you seen "Star Wars" and "The Empire Strikes Back"? Ever imagined you were John Wayne?

If any or all of your answers are "yes," you're a player of role-playing games — or you ought to be. (If your answers are all "No," you have either stepped through the looking glass by mistake, or fate knows your destiny better than you do.)

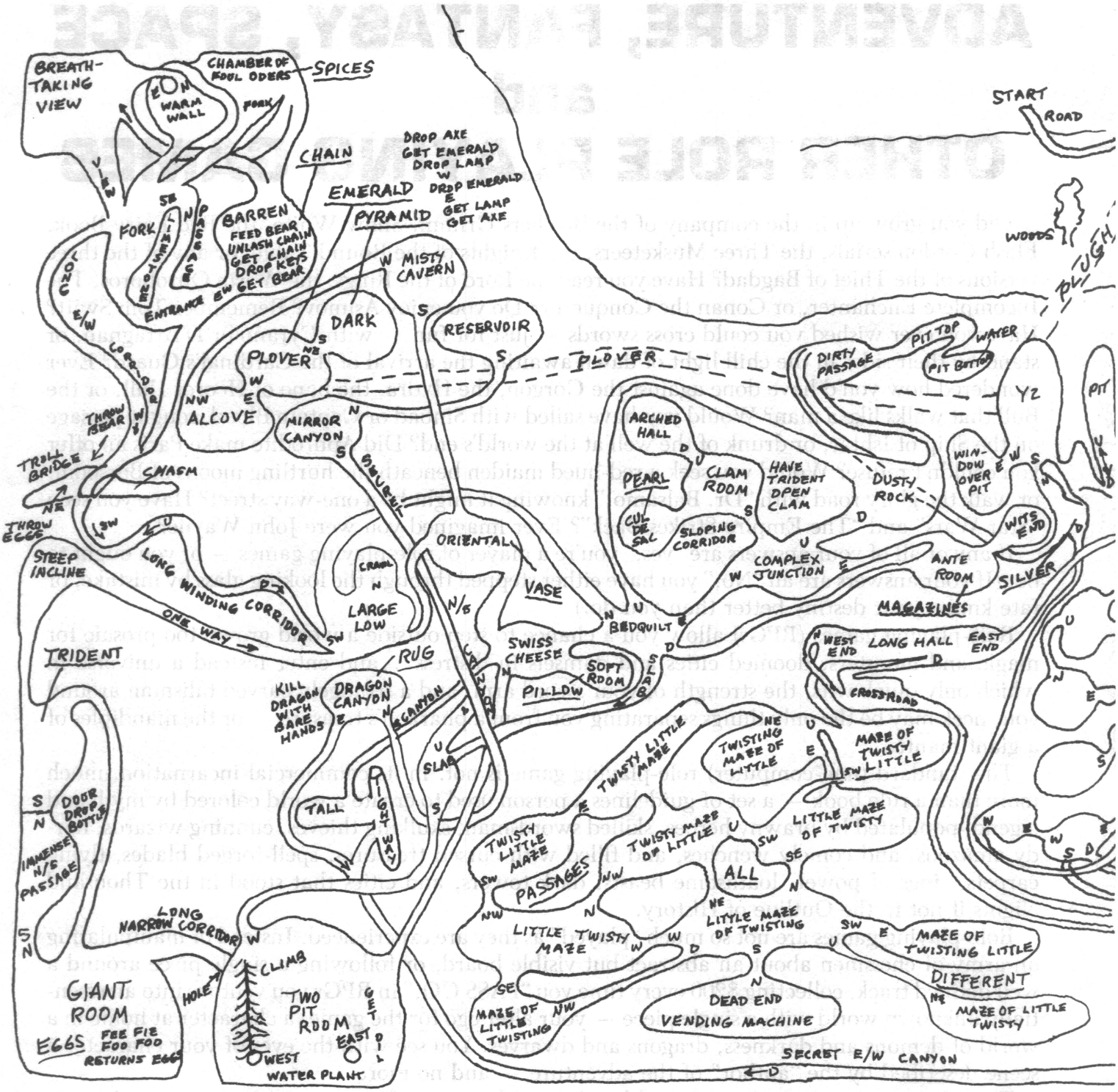
Role-playing games (RPGs) allow you a chance to step outside a world grown too prosaic for magic and monsters, doomed cities and damsels in distress. . . and enter instead a universe in which only quick wits, the strength of your sword arm, and a strangely carved talisman around your neck may be the only things separating you from a pharaoh's treasure — or the mandibles of a giant mantis.

The standard (non-computer) role-playing game is not, in its commercial incarnation, much more than a rule book — a set of guidelines a person used to create a world colored by myth and legend, populated by brawny heroes, skilled swordsman, skulking thieves, cunning wizards, hardy amazons, and comely wenches, and filled with cursed treasures, spell-forged blades, flying carpets, rings of power, loathsome beasts, dark towers, and cities that stood in the Thousand Nights if not in the Outline of History.

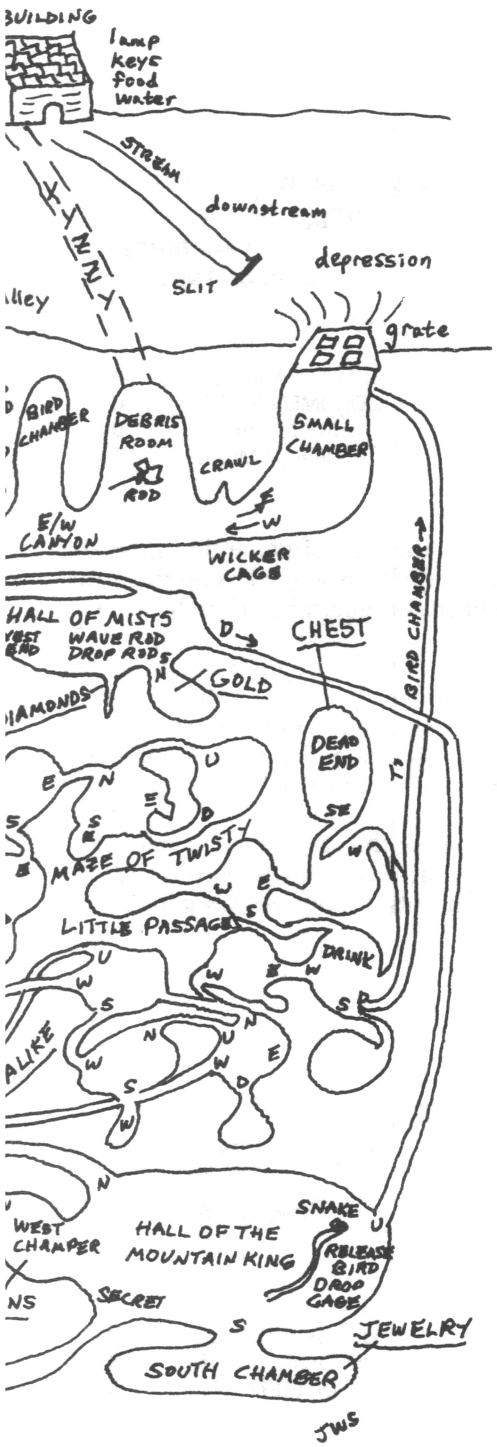
Role-playing games are not so much "played" as they are experienced. Instead of manipulating an army of chessmen about an abstract but visible board, or following a single piece around a well defined track, collecting $200 every time you "PASS GO," in RPGs you venture into an essentially unknown world with a single piece — your alter ego for the game, a character at home in a world of demons and darkness, dragons and dwarves. You see with the eyes of your character a scene described by the "author" of the adventure — and no more.

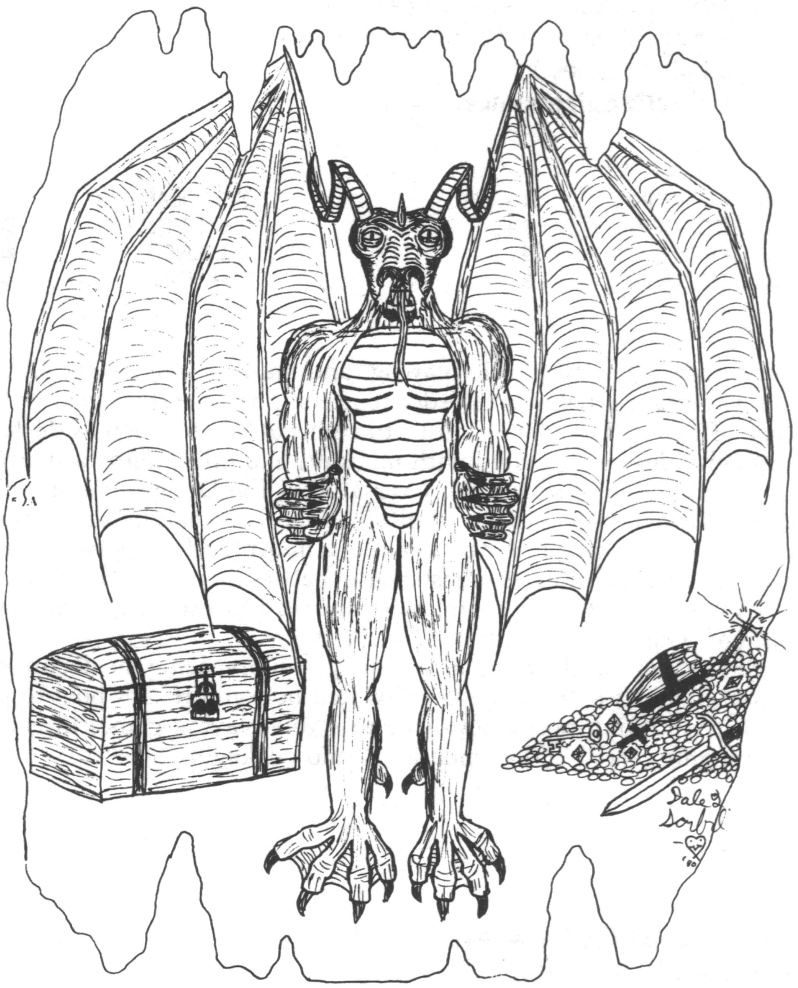
The adventure-type games reviewed herein run the gamut from scenarios of ancient times to the far distant future, from fantasy to murder and war. In sum, selections from these programs will provide you with many hours of enjoyment and "exercise" for your imagination.*

*Our thanks to Automated Simulations for allowing us to excerpt from the booklet accompanying their excellent program, "Temple of Apshai" comments concerning Adventure Games in general.



"TYPICAL" ADVENTURE MAP





A "TYPICAL" MONSTER YOU MIGHT ENCOUNTER DURING AN ADVENTURE

FANTASY & ROLE PLAYING GAMES

TEMPLE OF APSHAI

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	B–	ERROR HANDLING	A
GAME CONCEPT	B+	SKILL INVOLVED	C+	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	B–	HOLDS INTEREST	B+
GAME DEPTH	B+	GRAPHICS	B	VALUE FOR MONEY	B

Fantasy, adventure, role-playing, and maze adventure are all names applied to the type of game that gives the player certain attributes in order to accomplish a certain goal or task. *Temple of Apshai* is a good example of this type of game. The player must utilize his attributes such as dexterity, intelligence, fatigue, etc., to fight his way through a maze populated with monsters and other untoward dangers.

This is the longest and most versatile of the Dungeonquest series. The Dungeonmaster program allows one to create his/her own characters; alternatively, one can let the computer choose character traits and abilities at random. The player explores the rooms of a multi-level dungeon on a Hi-Res screen. Your character moves around from room to room, confronts monsters and battles them with his various weapons. All this is done with shape tables, including fight sequences complete with sword thrusts. The game has a choice of numerous difficulty levels and play options. Games can easily last for hours.

The author has shown as much thought in preparing the documentation as in writing the program. The documentation includes a "Book of Lore" which not only relates how to play the game, but provides the player with the background and mechanics of fantasy role-playing games in general. This is an outstanding Hi-Res game, with thoroughly readable documentation and packaging.

HELLFIRE WARRIOR

Company: Automated Simulations
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B–	ERROR HANDLING	A
GAME CONCEPT	B+	SKILL INVOLVED	C+	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	B

HELLFIRE WARRIOR is a full-length Hi-Res adventure game that almost literally starts where "Temple of Apshai", also by Automated Simulations, left off. It has no time limit as does the shorter "Morloc's Tower", "Datestones of Ryn", and "Rescue at Rigel" programs but it does have the same system commands and overall format as does the longer Temple of Apshai.

The game requires exploration of Levels Five through Eight of the "Temple of Apshai". Your character explores the 60 rooms of each level in search of treasures and a sleeping Brunhilde. Naturally, a multitude of monsters are encountered and must be dealt with. The level number is proportional to the strength and power of its inhabitants, so if you're brand new to the Automated Simulations series, you might consider the Temple or, for the general flavor of the game system, the faster playing "Morloc's Tower". On the other hand, if you liked the predecessors, you'll love HELLFIRE WARRIOR.

DANGER IN DRINDISTI

Company: EPYX - Automated Simulations
Language: Applesoft
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	N/A	EASE OF USE	B	DOCUMENTATION	B
TEXT QUALITY	D	VOCABULARY	N/A	VALUE FOR MONEY	B
GRAPHICS QUALITY	C	SAVE/RESTORE	C	HOLDS INTEREST?	C

Danger in Drindisti is the second expansion module for *Hellfire Warrior*, which you must have in order to make use of this program. You will encounter over 100 caverns, chambers, catacombs and a devilish array of monsters and demons. Getting started requires booting *Hellfire Warrior* and awakening your existing character, or creating a new one. Be warned, however, that a weak warrior will not long survive the four levels of *Drindisti!*

The King of Drindisti has summoned you to purge the Kingdom of four of his arch enemies. Each of these villians has unique and dangerous powers and magical treasures which you must return to the King. The Glass Wizard will be encountered first, but only after you find your way through the glass maze. The Illusionist of the next level is even harder to find and dispatch, since all things are not always as they appear. The going gets tougher with the next combatant, the Demonmaster. But the last assignment is the most difficult. You must enter the mysterious and dangerous Realm of Mist, and slay its demigod ruler. You may find a sage to help you find your way, but the going is tough; this level has demons so powerful that your warrior may be killed just by being in the same room as they are.

Adventuring is accomplished in the same manner as the original *Hellfire Warrior*. This disk contains only the data sets for an expansion, and care must be exercised against accidentally saving a game from the new disk onto the original *Hellfire*. Such action irrevocably overwrites the original, making it exceptionally difficult to try to play thereafter.

Game technique is the same as in *Hellfire Warrior*, and, as before, the action is viewed from above. Each room and treasure is numbered, and must be looked up by the numbers in the documentation. There are some very difficult mazes, part of which are made of glass, and are, therefore, invisible to the eye. Testing these walls can sometimes be detrimental to the health of your warrior.

Danger in Drindisti is a worthy addition to the *Hellfire Warrior* series. Fans of that program will enjoy this one; however, it's a toughy, and is not recommended for beginning adventurers. Even those who are ready for a good challenge have their work cut out for them.

CURSE OF RA

Company: EPYX - Automated Simulations
Language: Applesoft/Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	C	ORIGINALITY	C
PUZZLE QUALITY	N/A	EASE OF USE	B	DOCUMENTATION	B
TEXT QUALITY	D	VOCABULARY	N/A	VALUE FOR MONEY	B
GRAPHICS QUALITY	C	SAVE/RESTORE	C	HOLDS INTEREST?	C

Curse of Ra is the second expansion module for the *Temple of Apshai*, which you must have in order to make use of this program. This module adds four new levels to explore, more treasures to find, and more monsters to fight. Getting started requires booting *Temple of Apshai*, awakening or creating a new character, and inserting *Curse of Ra* when you're ready to leave the inn.

The setting is ancient Egypt; the task is to gain entrance to each of two pyramids, the Great Sphinx and the powerful Statue of Ra, and get the four treasures powerful enough to overcome the Curse of Ra. Naturally, inhabitants of these pyramids take exception to trespassers, and there are numerous traps and associated dangers. Due to the power of some of the monsters, it is advised to visit each level in numerical order. *Ra* contains over 100 rooms, and mapping is still a must. To complicate life, there are many secret rooms that are disclosed only by careful examination.

Game technique is the same as *Apshai*. Hi-Res figures are seen inside or outside of a maze of walls, as if viewed from above. Each level has room and treasure descriptions, but only in the Player's Manual — a distraction to the flow of the game, especially if one is trying to fight off a monster at the same time. As before, running away from some monsters will materially prolong your character's life.

Survival in *Ra* is not too difficult, and players of the *Dunjonquest* series will throughly enjoy this new addition of monster-whomping, mapping, and exploration.

MORLOC'S TOWER

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	B–	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B–	HOLDS INTEREST	B+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B–

Although MORLOC'S TOWER is not as elaborate as the "Temple of Apshai", Automated Simulations has provided yet another entertaining and challenging adventure game. The object of the game is to find and kill the mad wizard, Morloc. One spends his time wandering through the six floor dungeons battling monsters and finding treasures.

A plus to this game is that every time you play this adventure, the traps, monsters and other surprises are found in different locations. In addition, you can compete against your friends or your own past performance. The game is appropriate for beginners as well as advanced players since there is no "right" way to win.

Documentation is excellent. The authors provide a very attractive layout with clear and concise instructions including helpful hints. As a last resort, the player may wish to read some of the "answers" which disclose where Morloc may possibly be found.

DATESTONES OF RYN

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K Apple II/II +

Department: Entertainment
Sugg. Retail: $19.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B–	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C+

Datestones of Ryn is the second of the Dungeonquest series of fantasy games. This is the first of their "mini-adventures," since the character is defined and a time limit of twenty minutes is imposed.

One spends time exploring a building filled with monsters and thieves that try to stop you from recovering the missing ten datestones. As in the others of the series, the positions of all objects and monsters are randomized in a set-piece map, which appears in sections as one explores. Fighting sequences are animated with shape tables.

See the review on *Temple of Apshai* by the same vendor for an even more extensive example of this type of program.

RESCUE AT RIGEL

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B–	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	B–	CHALLENGE	B–	HOLDS INTEREST	B
GAME DEPTH	C+	GRAPHICS	B	VALUE FOR MONEY	B–

This game, modeled after the successful Dungeonquest series, is the first in their Starquest series. It is a Hi-Res game where you, the hero, attempt to rescue 10 humans held captive in a pyramid shaped Tollah moonbase. Armed with a blaster and a powerpack supplying your laser, shield and bionic gear, you attempt to find the humans and teleport them back to your base ship. The moonbase floors are connected by graveshafts and each floor and room has enemy Tollahs, monsters and sentry robots who consider you the enemy. The user has 60 minutes to complete the mission. It has excellent graphics.

FRACAS

Company: Quality Software
Language: Integer and Applesoft
Hardware Requirements: 32K and Disk

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**C**	DIFFICULTY	**C**	ORIGINALITY	**B**
PUZZLE QUALITY	**N/A**	EASE OF USE	**B**	DOCUMENTATION	**B**
TEXT QUALITY	**C**	VOCABULARY	**N/A**	HOLDS INTEREST?	**B –**
GRAPHICS QUALITY	**C**	SAVE/RESTORE	**C**	VALUE FOR MONEY	**B**

FRACAS is a light-hearted and fairly amusing medieval-days-of-combat and get-the-booty program with a few new twists. The diskette provides the identical game in both Integer and Applesoft versions. The game permits from one to eight players to independently move about and do battle with each other, as well as with the computer's own menagerie. Under some conditions, these computer characters are perfectly happy trying to kill each other off, while you are free to watch or get their ducats and then take on the survivor. The use of sound has been effectively coupled to the seemingly unending and repetitious combats on a Lo-Res field of well-thought out and colorful displays. (It is not recommended for a B & W display.)

The game is simple to play and character generation is well prompted. Game commands are few and simple. There are no puzzles, mazes, or mental challenges. The game objective is in the mind of the player(s), and several interesting alternatives are suggested in the documentation. The multiple-player concept and extreme simplicity make FRACAS a lot of fun for a group of small children, while the ease of creating a new player character or committing hari-kari make it a perfect party game for your non-computer friends. On the other hand, it won't cause them to run out and buy an Apple or provide you much reason to play "solitaire" against it more than once.

ALI BABA AND THE FORTY THIEVES

Company: Quality Software
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $32.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B**	DIFFICULTY	**C**	ORIGINALITY	**B**
PUZZLE QUALITY	**C –**	EASE OF USE	**B**	DOCUMENTATION	**A**
TEXT QUALITY	**C +**	VOCABULARY	**N/A**	HOLDS INTEREST?	**B +**
GRAPHICS QUALITY	**B +**	SAVE/RESTORE	**B –**	VALUE FOR MONEY	**B**

Ali Baba and the Forty Thieves is a major update to Quality Software's earlier *Fracas*. The changes are so major, however, that even *Fracas* gamesters will find it a new game with familiar concepts. Chief among the additions are colorful, shape-tabled Hi-Res graphics, and an often-played rendition of several bars of Scheherazade (which mercifully can be cut off). There are also completely new layouts and characters, as well as room and text descriptions. Basically, *Ali Baba* remains a game of beating up on the monsters (or vice verse), finding treasure to buy more effective weapons and armor, and, with the addition of a definite quest, rescuing the Princess Buddir.

There is a degree of puzzle content, but it's not really sufficient to classify *Ali Baba* as an adventure game per se. Hints, either obtuse or bluntly direct, are found in Runes. These cause your disk to wake up when encountered; other than that, there is no disk interaction in the entire 60-plus room game. New Hi-Res displays are nearly instantaneous, but the unfortunate byproduct of this is a very slow response in the interminable sequence of combative encounters. These delays are only slightly offset by the humorous text accompanying the encounters. Even with the Monster Regeneration Factor (i.e., difficulty control) set to zero, there seems a near endless procession of assault-minded thieves and assorted monsters. Mitigating against this, but again at the expense of longer delays before it is once more your turn, there is the ease of calling in a veritable army of allies, including yourself or any favorites that may have just been killed off. This multi-player capability also simplifies the difficult task of mapping, made complex by the extensive use of one-way doors and teleporting locations.

The game may be played either from the keyboard, for one or two players, or with a paddle control; paddle control is the easier, as there is an overuse of I, J, K, and L as command keys on the various sub-menus, where each letter has a widely diverse command function. Nine games may be saved to the protected disk, and bunches more to a scratch disk initialized from the program disk. Warning: on one sub-menu, "J" is the Save command, and the adjacent "K" is the Initialize command. However, the documentation, which is thorough, insists that one cannot damage the master disk (this reviewer didn't have the nerve to try).

A particularly novel and amusing feature that is brought forward from *Fracas* is that the baddies, all being played by the Apple, are not too particular whom they clobber, and will gladly pile onto other baddies. It's sort of fun to start a fight and then sit back and watch your enemies beat the daylights out of each other! This feature, together with the multi-player capability, make *Ali Baba* a lot of fun. Somewhat tedious perhaps, but fun nevertheless that the younger set, especially, will enjoy.

WIZARDRY

Company: Sir-tech Software, Inc.
Language: Pascal-P Code
Hardware Requirements: 48K Apple II or II + Disk Drive

Department: Entertainment
Sugg. Retail: $49.95
Availability: 9
Disk or Tape: Disk

OVERALL RATING	A	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	B	EASE OF USE	A+	DOCUMENTATION	D
TEXT QUALITY	B	VOCABULARY	N/A	HOLDS INTEREST?	A
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	A+

WIZARDRY is a sophisticated and professional Dungeons and Dragons game that realistically follows the original board game. Put another way, it's a program that combines the better features of Beneath Apple Manor, the Eamon/Swordthrust series, (parts of) Ultima, and Dragon's Eye, in addition to throwing in a number of new ideas of its own to produce a very detailed and interactive "kill the monsters and get the gold" type of game.

The two-sided disk provides a Program Master and Scenario I entitled the King's Proving Ground. The clear implication is that there will be more scenarios to come. Written in Pascal (the P-Code does NOT require a Language Card), this multi-menu game is very fast in its response to commands and is only occasionally disk interactive.

The game provides the player a degree of control over character selection and control seldom found in a computer game. Up to six characters at a time are put in play, chosen from five races, three alignments (good, bad and evil); each may be of eight different classes, with its own unique capabilities and limitations. Monsters are many and varied, magic spells abound, and the dungeons are seen in 3-D perspective in one corner of a well laid-out and informative screen. Inherent in the game's design is an excellent save-game concept, whereby different players can store many characters, each protectable by a "password".

All is not peaches and cream, however,. The game is long and involved, while providing little insight into how the interactions are designed. It also requires considerable time and effort to develop characters that can survive in the dungeons long enough to advance to a higher level where new spell capabilities and character attributes are garnered. Despite unusually informative displays and complete documentation, the combat phases will require repeated reference to both the spell lists and the player's notes. While an option to run from combat is provided, it usually results in total destruction of your party, as the monsters flail away at you during your attempts to flee. No breaks.

WIZARDRY has too many options and character preparations to rate highly with young kids. It is directed more towards serious D&D enthusiasts. There are no puzzles to be solved, but planning and thought are mandatory, as is the mapping of the dungeons. Even if you've been put off by earlier Apple D&D versions, you should give WIZARDRY a long, evaluative look as it's a complete and legitimate fantasy role-playing game.

KNIGHT OF DIAMONDS

Company: Sir-tech Software, Inc.
Language: PASCAL-P Code
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $34.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	B	EASE OF USE	A+	DOCUMENTATION	D
TEXT QUALITY	B	VOCABULARY	N/A	VALUE FOR MONEY	A
GRAPHICS QUALITY	A	SAVE/RESTORE	C	HOLDS INTEREST?	A+

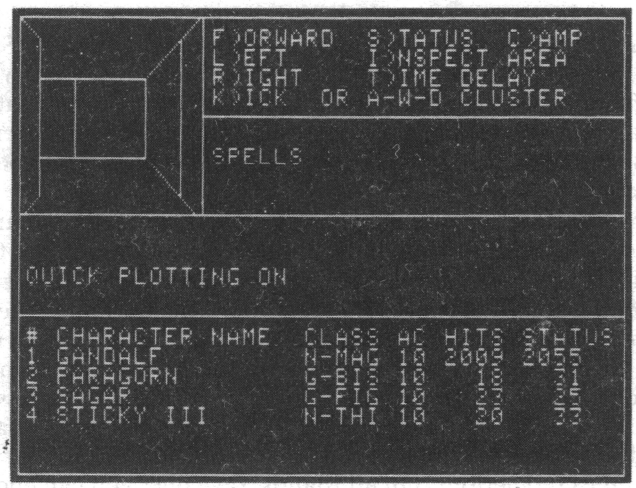
Knight of Diamonds is the second scenario in the already classic *Wizardry* series. This dungeon offers new puzzles, objects, monsters, and traps, and adds six challenging levels, requiring careful mapping and considerable patience to conquer. General operation of *Knight of Diamonds* is identical to the first scenario, *Proving Grounds of the Mad Overlord*.

The object is to find and return the Staff of Gnilda to the City of Llylgamyn (whoever said you have to be able to pronounce what you play?). There is much more to explore and learn than just recovering the staff, and careful and probed mapping is required to discover them; it may be easier to discover secret doors when its "Very Dark," which simply says you've got something to kick about! To get started you must have developed characters from the *Proving Grounds* and then transfer them to the new scenario, using the Utilities on the Boot Side.

It is recommended that characters be at the 13th level or higher; the need for this will soon become painfully obvious. It is possible to encounter the "disaster" of having your entire party paralyzed and lost forever (i.e., back to square one on scenario one), although the unexplained "Disband" command appears helpful in avoiding this finality. Unfortunately, there is no documentation with *Diamonds*, and unless you have a late version of the *Proving Grounds*, the subtle differences can be bothersome. As with later versions of *Proving Grounds*, a Utility permits you to make a backup of the scenario side, to which you can then transfer your characters. Although this reviewer had two disk failures on *Proving Grounds*, the first scenario copy of *Diamonds* survived through the final awarding of the letters.

In the dungeon you will meet with the No-See-Ums before too long. Their number (4 groups of up to 9 in each group), may get your heart beating and take forever to end their turn, but then there is always "Tiltowait"! Much worse than these pests are some of the evil creatures that love to take all but one hit point away from your favorite members. But what is really final is the setting off of a Teleporter and being transported into solid rock, of which there seems to be much more than in *Proving Grounds*.

Knight of Diamonds is the maze-type adventure at its best. As with the original *Proving Grounds*, it can be played with from one to six people (with one person acting as the Dungeon Master at the keyboard), and will provide many more interesting hours of game fantasy. The bottom line is that *Knight of Diamonds* is just like having levels 11 through 16 added to your initial *Wizardry* scenario disk.



WIZARDRY

WIZ MAKER

Company: ARS Publications
Language: Applesoft ROM
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $20.00
Availability: 1
Disk or Tape: Disk*

OVERALL RATING	**A**	EASE OF USE	**A**	ERROR HANDLING	**A**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**B**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	VALUE FOR MONEY	**A**
GAME DEPTH	**N/A**	GRAPHICS	**B**	HOLDS INTEREST?	**N/A**

Wiz Maker is a character editor for the fantasy game, Wizardry. What it essentially allows you to do is CHEAT. Ethics aside, there is a substantial need for such a utility. The *Wizardry* program keeps track of all characters and their status on the disk. While the authors have always advised to keep a backup character disk using their utility, most players don't heed the advice. I for one, not reading the instructions carefully and forgetting to buy armor for one character, managed to disband before entering the dungeon. Well, my characters certainly weren't lost in the dungeon, although they were listed as "out." Fortunately, I wasn't too attached to my characters so I didn't mind the loss. But others who have trained and fought with characters that they considered "family" are sometimes deeply grieved at a character's death.

Wiz Maker is a menu driven program that can change nearly any character's features. This includes in/out status, or whether a character is dead, paralyzed, stoned, evil, good, etc., its alignment, age, experience, attributes, and hit points. The player's name, password, race, and class can be modified. The editor can alter the number of spells available for each level and gives you the choice of which spells the character knows. Thus characters of super hero status (10,000th level) can easily be created.

The program is simple to use. It is completely menu driven. Most values remain unchanged with a simple carriage return. The entire set of 20 disk characters is read into memory at the same time. After analysis, the program allows you to display all the characteristics either to the screen or line printer. You can then enter the modification mode to change their character any way you please. Upon completion, the 20 characters are written back to the disk. Error trapping and reliablity are excellent. While it is unlikely that the program will ruin an orginial disk, it is best to modify a *Wizardry*-made duplicate scenerio disk.

While purists will call such a program blasphemy, the frustrated *Wizardry* player who has been unable to venture past dungeon level two will find this program a blessing. And for those who are itching to play *Knights of Diamonds*, the *Wizardry* sequel that requires 13th level characters, this program is a quick shortcut to creating some.

ODYSSEY

Company: Synergistic Software
Language: Integer and Applesoft version
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B+	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	C	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	N/A	HOLDS INTEREST?	B
GRAPHICS QUALITY	A	SAVE/RESTORE	N/A	VALUE FOR MONEY	B+

ODYSSEY is an epic extension of its forerunner, "Wilderness Campaign", also by Synergistic Software. As with "Wilderness," the object is to overcome the bad guy in the castle by trekking through plains, swamps, mountains, and deserts, collecting men and material by negotiations with merchants and doing battle with sundry monsters. In Wilderness, there was one outstanding Hi-Res multi-color display that held your attention for the duration of the game; ODYSSEY provides two such outstanding displays, a third that's almost as good, and a quasi-Hi-Res maze that smacks of "Dungeon Campaign".

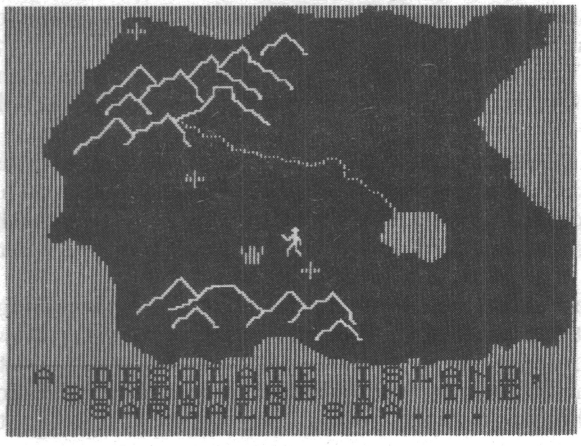
The initial ODYSSEY display is that of an island, where graphics are even enhanced over Wilderness by individually small but collectively significant improvements. Similarly, other aspects of this phase are improved; better sounds, fewer total repetitious battles, a simplified and cleaner battle display. The documentation is jazzed up, and the program runs better from the standpoint of error trapping. Much remains the same, however; the game is pure escapism in all phases, no real thought is demanded and the few puzzles are trivial. What is demanded is endurance, made enjoyable by the display quality and bearable by the Save Game command.

The second Hi-Res display is of your small ship in the big ocean. This phase is less polished than the first land phase, but has several neat "special effects" that are fun. It's a challenge to learn to sail your ship as the wind and current change frequently, but after you learn which of the other visible islands is your final port, the sea phase progresses more rapidly than the initial island actions. On all islands, save one, you can encounter a wizard guarding an old temple. You need to convince him to allow you to pass in order to venture into a Hi-Res maze of basements, again doing battle with or running from assorted monsters while in search of the magical Orb. These game phases are not as well error-trapped as the island phase, thereby allowing the ability to spend "negative" money and deal with fishermen whom the text lines told you sailed off several moves ago.

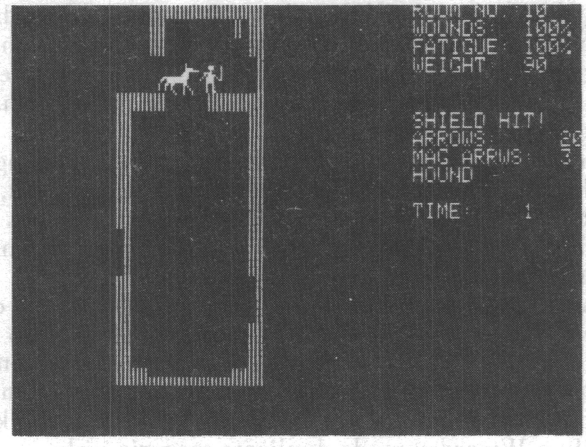
The final Hi-Res island is artistically done. It presents only five simplistic obstacles to overcome until "you reach your final objective." At this point, the game disappointingly ends with a simple text tabulation of your net worth, adversaries killed and general summary. After the time investment necessary to get to this point, it seems a shame to forego the snazzy type of ending available in "Wilderness Campaign".

Overall, ODYSSEY is an improved and lengthened "Wilderness Campaign", interesting by virtue of sight and sound, that can become tediously repetitive. Kids will love it, others may lose interest, but it's fun until that happens.

A last comment: there are still a couple of programming errors to watch out for, similar to those found in "Wilderness Campaign".



ODYSSEY



MORLOC'S TOWER

DUNGEON CAMPAIGN

Company: Synergistic Software
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $17.50
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C–	CONTROLABILITY	C	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C–	HOLDS INTEREST?	C
GAME DEPTH	C–	GRAPHICS	D+	VALUE FOR MONEY	C

This is an adventure game involving a group of warriors who venture into an undergound labyrinth consisting of four different levels. This game makes use of catacombs filled with treasures and hazards in a colorful fashion. As the secrets of the dungeon are uncovered by the forces under your control, a color-coded map is generated which eventually helps you find your way out safely with your treasures.

The documentation is well-organized and comprehensible; it also includes information which the "casual user" might want to know about the program. The screen layouts are attractive and versatile, as they change periodically during the player's travels throughout the dungeon.

DOOM CAVERN/ SORCERER'S CHALLENGE

Company: Syngergistic Software
Language: Integer
Hardware Requirements: Integer Firmware, 48K RAM, and Disk Drive

Department: Entertainment
Sugg. Retail: $20.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	D	DIFFICULTY	D	ORIGINALITY	C
PUZZLE QUALITY	D	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	B	SAVE/RESTORE	C–	VALUE FOR MONEY	D

DOOM CAVERN

DOOM CAVERN is the "beginning" of a rather well done solitaire Adventure game. However, for the number and length of its subordinate programs, there are no major challenges, and it's over all too soon. Once you've explored level one of the cavern, that's it. If you are an adventure gamer, it might take all of 45 minutes to solve.

The idea is for you to thwart an evil necromancer's plot to kill a Prince and his wizard adviser. Accomplishing this requires fully exploring the dungeon level as provided on this disk, getting a few treasures and magical weapons along the way and, naturally, doing in the evil critters that you encounter.

The end comes quickly when you locate the entrance to Level 2 of the caverns. At this point, the player is given a rather spectacular accolade with three options: quit, repeat Level 1 again, or go on to Level 2. In a sense, DOOM CAVERN is a commercial version of the Eamon Adventures; you will always need the "beginning" disk in order to use the follow-up challenges on the other disks.

The displays are nice, playing is straightforward and reasonably fast. There are a few non-fatal bugs which cause the cursor to jump in arbitrary directions at times. All in all, DOOM CAVERN is not up to Synergistic's earlier productions in the areas of graphics, length, or true involvement. The game would be improved if at least two levels were included on the disk so that the true flavor of the game could develop.

SORCERER'S CHALLENGE

Perhaps to make up for the shortcomings of DOOM CAVERN, a second game has been included on the same disk. SORCERER'S CHALLENGE is a two-player (only) game which, with the right opponent, can be rather challenging and interesting; however, it is hardly a new game concept.

Two opponents (Wizards) are situatedon opposite ends of a small, well-done Hi-Res island. By moving the paddle controls to position a cursor and then pressing the game button, one can "block" a square on the island by casting a magic spell.

The object is to block your opponent totally so that he is unable to move into an "unblocked" square. The element of difficulty is well handled by permitting each player to have a different number of "spells." The game is straightforward and makes good use of the Apple's display and sound capabilities. Nevertheless, this reviewer would have preferred to have the second level of CAVERN on the disk space occupied by CHALLENGE.

ULTIMA

Company: California Pacific Computer
Language: Applesoft & Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	C	EASE OF USE	A	DOCUMENTATION	D
TEXT QUALITY	A	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	A+	SAVE/RESTORE	A	VALUE FOR MONEY	A+

Ultima is an adventure game of truly epic proportions, consisting of three neatly integrated major games, each with a subset and end game thrown in for good measure. The game starts in the Medieval period. Armed with daggers and leather shields, and progressing through the space age with blasters and reflective suits, your *Ultima* role playing character evolves in experience and attributes through fifteen levels, finally arriving at the "ultimate confrontation" after a trip through time.

Ultima is perhaps the best of the maze adventure role-playing games for the Apple, in that a variety of characters can be created and evolved. It is not a particularly thought-provoking or logic-puzzle game. The puzzles included are straightforward. The adventure's object and approach are easily deduced from the clues within the game. The challenge lies in its sheer massiveness and sequential evolution.

The above-ground and space graphics are excellent, but the below-ground game is a slightly modified *Alkabeth*. (Hint: keep a record of which level certain types of monsters appear.) The game could be improved by holding the number of monsters in each sea, dungeon, and land area to a fixed number so that one could eventually roam around more freely in order to finish the adventure more quickly once the novelty of the encounters has worn off. The game can (and should be) saved rather frequently; however, unfortunately, a game cannot be recalled except by hitting RESET or turning off the system power. Also, the "Q" key, which saves the game, is disadvantageously located close to ESC, another often-used command key.

Considering that the game involves eight castles, eight monuments, some 32 cities and dungeons, and an 8 by 8 sector space setting, it's too bad that there couldn't have been some slight differences between each object within the group. Interestingly enough, it's possible to steal an item that has not yet been invented from an Armourer or Weapons Dealer and which, therefore, he doesn't carry in stock. Despite these minor aggravations, *Ultima* represents a superior achievement that can be as much fun to play the second time around as it is the first.

ALKABETH

Company: California Pacific Computer
Language: Applesoft
Hardware Requirements: 48K

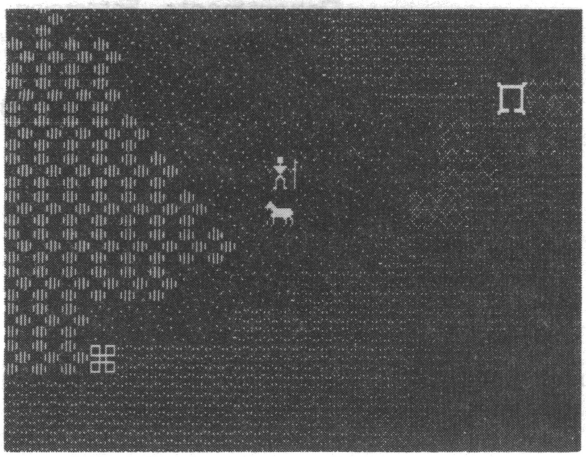
Department: Entertainment
Sugg. Retail: $35.00
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	C–	DIFFICULTY	C	ORIGINALITY	C
PUZZLE QUALITY	D	EASE OF USE	C	DOCUMENTATION	C–
TEXT QUALITY	C	VOCABULARY	N/A	HOLDS INTEREST?	C–
GRAPHICS QUALITY	C–	SAVE/RESTORE	N/A	VALUE FOR MONEY	D

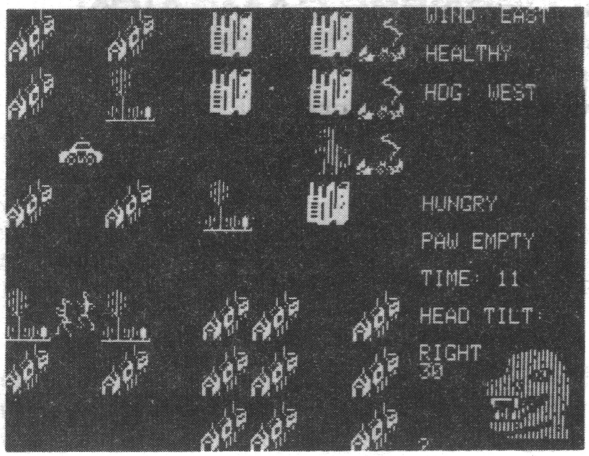
ALKABETH is a kill-the-monster type adventure game which promises more than it delivers. An eight-element attribute character is randomized for you; you can accept or reject the assigned attributes, but otherwise cannot improve or alter them. After equipping your character (food and weapons) from a yes or no (i.e., no-bargaining) menu, you go forth onto a simplistic and poorly implemented playing field, first to find the castle where you are assigned a quest and then march about in the monster-free countryside until the dungeon(s), marked as a big "X", are found.

The dungeons are ladder-connected levels of interconnecting hallways and doors, done in B/W Hi-Res with shape table monsters and straight lines. The system commands are limited to basic move, turn, and attack functions, although two exist (pause and pass) which over 50 frustrating games failed to show any use for or effect from. Your character eats like a pig, and dies immediately without food, so start with at least 40 "foods" or the game will be over before you even find the castle.

ALKABETH offers no mental puzzle, logic options, or true strategy, just a yes-no slug-it-out program, which might be made into an acceptable game if the program could be listed for purposes of modification.



ULTIMA



CRUSH, CRUMBLE & CHOMP

CRUSH, CRUMBLE AND CHOMP

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk: Disk*

OVERALL RATING	**B**	DIFFICULTY	**B**	ORIGINALITY	**A**
PUZZLE QUALITY	**N/A**	EASE OF USE	**C+**	DOCUMENTATION	**A**
TEXT QUALITY	**N/A**	VOCABULARY	**N/A**	HOLDS INTEREST?	**B–**
GRAPHICS QUALITY	**B**	SAVE/RESTORE	**N/A**	VALUE FOR MONEY	**B**

In CRUSH, CRUMBLE and CHOMP you can play one of six featured monsters (or one of your own home-grown creatures) to attack the city of your choice: San Francisco, Washington, D.C., New York City, or Tokyo Harbor. With your fiery breath you can burn entire cities or smash them underfoot. You can block roads with your webs and escape underground where tanks dare not tread. Your monster can tear apart bridges with its tentacles, emit an ultrasonic scream as you grab the populace and fly over a city of smoking ruin.

Of course, being a monster isn't easy. You're always hungry. A good rule is: if it moves, it's edible. And the city, played by your friendly computer, has an arsenal of police cars, tanks, artillery, helicopters, National Guard, and your indomitable mad scientist.

You control the monster with a variety of keyboard commands. All monsters have a basic command structure that controls general direction, head position, and movement. Some monsters can burrow, one can fly. All can crumble buildings or grab fleeing crowds. Each has its specialty, like (A)tomize or (U)ltrasonic Scream, (B)reathe Fire, (W)eb (weave obstructing web), or (Z)ap flying units with ray gun. Control, at least if your monster hasn't gone berserk with hunger and you're not sure if it is really paying attention, is rather sluggish. This is because you're taking turns with the computer and it's not ready for your next command. Be patient; it has to update the screen and attack before you can make a next move. Impatience, unfortunately, causes you to enter too many commands; consequently, one often overshoots a destination or misses a target.

One can monitor the game as you move around sections of the city on a Hi-Res map. Your monster's health, his hunger status, head position and general direction are all displayed on the right side of the screen. The head position is displayed in all its living facial monster horror. It keeps you aware of who or what you are.

Yes, this game is for real and it actually can be fun to play once you get used to the keyboard controls. It is certainly a way of releasing your aggressions and no different than those shoot-'em-up games where you play the good guy and kill the aliens.

I think the major disappointment lies in the graphics. The display map and animation are done with well constructed Apple shape tables, but the display update is slow and cumbersome. While some of the newer games have switched to raster shape tables and machine code to produce smooth, instantaneous Hi-Res scrolling on their maps, this game laboriously draws a new map once the monster goes off the edge of the screen. In a game that essentially runs in real time, this is somewhat distracting. The game does offer a lot of creativity, is challenging, and is well documented in a lengthy but humorous vein.

WILDERNESS CAMPAIGN

Company: Synergistic Software
Language: Integer
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $20.00
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**B**	DIFFICULTY	**C**	ORIGINALITY	**A**
PUZZLE QUALITY	**C**	EASE OF USE	**A**	DOCUMENTATION	**C**
TEXT QUALITY	**B**	VOCABULARY	**N/A**	HOLDS INTEREST?	**B–**
GRAPHICS QUALITY	**A–**	SAVE/RESTORE	**B**	VALUE FOR MONEY	**B**

This is an adventure game that is definitely entertaining and exciting. The object is to free the kingdom of Draconia from the Evil Necromancer. Initially, it is necessary to acquire enough treasure to hire an outfit or army and buy goods. The program provides a Hi-Res graphics map. You direct your party across the map while overcoming obstacles and natural hazards.

Although documentation is not as elaborate or as colorful as other adventure games, it is adequate and explicit. The game is not that difficult to learn, nor is it too easy for the reasonably experienced player. The only suggestion would be that the map change periodically for variety as opposed to viewing the same map throughout the game. A good buy for any adventure players. NOTE: There are a couple of "BUGS" in the program which may cause the program to "BOMB."

SWORDTHRUST

Company: CE Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**C**	DIFFICULTY	**C**	ORIGINALITY	**C**
PUZZLE QUALITY	**B**	EASE OF USE	**C**	DOCUMENTATION	**B**
TEXT QUALITY	**C**	VOCABULARY	**B**	HOLDS INTEREST?	**C**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**C**	VALUE FOR MONEY	**C–**

Swordthrust is a commercialized successor to the public-domain Wonderful of Eamon series, both devised by Don Brown. Fans of Eamon will thoroughly enjoy this more complex and generally improved classic maze adventure type game. Thus far, there are four diskettes in the series: the Master ($29.95) includes an equivalent of the Beginner's Cave, which is titled The King's Testing Ground, and the character generation programs, which are mandatory for the other *Swordthrust* adventures, priced at $24.95 per game.

The *Swordthrust* series incorporates many changes vis-à-vis the Eamons editions. One can bargain with the familiar (albeit differently named) merchants, but doing so is a slow process which aggravates the already lengthy process of character generation. The element of time has been introduced; however, the major change is the addition of a reasonable degree of puzzle-type challenge in all adventures. This welcome improvement offsets the inordinate number of corridors and passageways that add little to the interest or character of the game. The major difficulty lies in the lengthy development process of a character and the inability to effectively save a favorite character because of the disk protection method. Similarly, many Eamon enthusiasts modified the program to give their characters a better chance at a reasonable survival period, which isn't possible with *Swordthrust*. Consequently, characters are all too easily killed off (you still get only one life!) after a lengthy period spent in building and developing their personae.

There are still the many battles to be fought and treasures to be found, plus more than enough of the nature and feel of Eamon to please the "oldtimers", making this series, at long last, a worthwhile package for recompensing Brown for his pioneering creativity and efforts in the adventure game field. Hopefully, however, he will allow changes to future Master disks for permitting retention of a character after being called into action and possibly wiped out.

APVENTURE TO ATLANTIS

Company: Synergistic Software
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $40.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	C	ORIGINALITY	A
PUZZLE QUALITY	C	EASE OF USE	A	DOCUMENTATION	A
TEXT QUALITY	C	VOCABULARY	C+	VALUE FOR MONEY	B+
GRAPHICS QUALITY	A	SAVE/RESTORE	C	HOLDS INTEREST?	B

Apventure to Atlantis is a smoothly animated, High Resolution game, complete with nicely done sound effects that neatly blend elements of adventure, arcade, and fantasy games into a single package. The object is to find and destroy the island of Atlantis, hopefully escaping alive. The game strongly resembles Robert Clardy's earlier *Odyssey* and *Wilderness Campaign*, except that this has a variety of new and novel ideas.

There are four distinct phases to the game. During the first phase on the island of Lapour, the player encounters and fights various monsters. The outcome is determined by a combination of strength factors and dice rolls. Obtaining an additional army, destroyed in these battles, is as easy as returning to the castle. The player also randomly encounters wizards who can be enticed into joining your party by the offering of spells. Monsters are small and very hard to see on the island's Hi-Res map display. Play during this phase quickly becomes tedious.

Game control during the sea phase (the second phase) is by a combination of keyboard and paddles. The ornicopter's movement is difficult to control and requires learning to fly against varying wind currents, navigating over islands, and fighting off strong monsters with a number of paddle controlled weapons while your fuel dwindles. Play during this real time phase is hectic; and if you have choosen a fast reaction time, nearly impossible.

Phase three takes place in buildings on the islands. Although boring and repetitive, this phase allows you to refuel and gain the magical spells required to cope with the perils of Atlantis. The buildings have puzzles and traps in them to overcome. For example, there are three notes in each building that contain clues to magic words which will open secret doors to other rooms. There are also opposing warlocks and trogs to combat. Eventually a room will be found that will enable you to refuel your craft and leave the building. Spells needed on Atlantis can be obtained by using the magic "detect spell" on some of the treasures. All buildings contain the same rooms, furniture, and traps. They are simply put together randomly on each island.

If the player feels that he has acquired sufficient magical spells, then he should try to fly his ship to the island of Atlantis for the fourth and final phase. The scenerio is played out on an island map containing a prominent volcano. Exploring the island is a game within itself as you map the maze-like terrain. As the island's maze guides you toward the Crack of Doom, you encounter many Hi-Res puzzle-type drawings. Solving these leads you to inaccessible portions of the island that you were unable to map, and one provides a clue to your escape route. There are many dead ends and hazards to prevent you from completing your quest. It will take all of your best spells to succeed.

Synergistic provides an excellent Hint Sheet with extensive documentation. However, it lacks a listing and description of valid commands in the various phases. Upon beginning each new phase, be sure to press "?" and study the command capabilities carefully, or you will never escape from an island. The stop-action "Suspend" command is always available and should be used to study a situation, as the real-time element of an attack poses a danger requiring a response speed proportional to the selected degree of difficulty (Arcade freaks will go for "9"; staid Adventurers should opt for "0").

The game is long, repetitive, and often frustrating; buildings on each island all have the same 21 rooms (rearranged on different islands), with the same traps to overcome. Use of a Magic Orb is a neat form of an internal save-game feature, especially if you lose a key wizard. A single scenario may be saved to the protected disk. A limited vocabulary is nicely overcome by using single keystrokes that produce all acceptable action verbs. One bad feature is that the game will not check for using the same name twice; but the capabilities of the second name then are "locked" out by the first. Also, at the Crack of Doom, be sure to DROP, rather than USE the Orb!

The puzzles are not at all difficult, being of the trial and error type (a la *Odyssey*). The mapping of maze-like *Atlantis* is an exception, however, and is a fun challenge. The game will especially be enjoyed by fans of Clardy's earlier games, and is noteworthy for its excellent documentation and several new gaming concepts, innovative command structure, and the Hi-Res display of *Atlantis* that "colors" itself in as it is sucessfully explored.

BENEATH APPLE MANOR — SPECIAL EDITION

Company: Quality Software
Language: Assembly
Hardware Requirements: 48k Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	DIFFICULTY	C	ORIGINALITY	A
PUZZLE QUALITY	D	EASE OF USE	A	DOCUMENTATION	A
TEXT QUALITY	C	VOCABULARY	N/A	VALUE FOR MONEY	B+
GRAPHICS QUALITY	A	SAVE/RESTORE	A	HOLDS INTEREST?	A

Beneath Apple Manor is a neat update to the original BAM (*The Book*, 1982, p. 241), and now features colorful Hi-Res graphics. When released in 1978, it was one of the first fantasy adventures for the Apple; and has since become a classic, even though there are no puzzles or a true mystery to the game.

The concept of BAM is simple: find the Golden Apple, hidden deep in a multi-level cavern. The monsters encountered become more powerful in the lower levels, but by then you've searched out the magical items and gained the experience that you need to cope with them. Applers not familiar with BAM may be disappointed in this simplicity, but it is just this quality that gives BAM its strength, staying power, and variety of approach strategems.

The full range of original options is still available — up to ten rooms, and a one-to-ten level of difficulty. In the "standard" game of five rooms or less, the new shape-table Hi-Res graphics adds an interesting new dimension. The familiar Lo-Res display of the original can be used for any number of room configurations, and must be used for six to ten room games due to screen size limitations. BAM devotees will be pleased that the new assembly language version is lightning fast in its reponse, has switchable sound effects, and embodies a save-game feature which permits a game to be saved to a scratch disk each time you buy a "scan."

The Special Edition also has three new magical items and two new types of monsters, a fairly easy to handle Invisible Stalker, and a Vampire that is nearly as difficult to handle as the Dragon. Even without these additions, owners of the original BAM will find the improvements in the game worth the price. Those who have never played *Beneath Apple Manor* before will find it to be undemanding of fast reflexes or a lot of thought — it is escapism, pure and simple, and an untiring form of fun.

THE PRISONER

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	B	DOCUMENTATION	B
TEXT QUALITY	B	VOCABULARY	N/A	HOLDS INTEREST?	B
GRAPHICS QUALITY	C–	SAVE/RESTORE	B	VALUE FOR MONEY	B

PRISONER has the feel and characteristics, both good and bad, of a typical Edu-ware program. Based loosely on the BBC TV series of the same name, you are kidnapped to a near escape-proof island, where "they" try to get you to divulge certain intelligence information by any means, fair or foul, with the emphasis on trickery, psychological warfare and brainwashing techniques. To win, you must escape your island prison (though you are free to roam about seeking clues, reliable allies, and conch shells).

The sole weapons at your disposal are your wits and intelligence; the Apple ungraciously will not help you in any way in piecing together or even remembering the subtle clues which you find. The game, which can be saved, is extremely lengthy and often slow, due to much disk accessing. This adventure/saga uses attractive B&W Lo-Res (and a few Hi-Res) displays with excellently designed text windows, an overabundance of shrill, repetitious, cacophonous sound, as well as seemingly unending inverse and flashing text.

The contest very quickly becomes hard on the eyes and ears, and belabors an excessively long and slow opening scenario. The documentation states that these irritating features are psychological necessities of the game designed to maintain your interest. Unfortunately, they are excessive to the point of killing an otherwise novel and fascinating game. Indeed, the puzzle of unraveling the clues is difficult and challenging, and the "special effects" are interesting (but overdone). In several regards, PRISONER is akin to a more seriously structured Scott Adams' adventure with psychological, and, perhaps, controversial overtones. (Certainly many *loud* overtones!)

DRAGON'S EYE

Company: EPYZ (Automated Simulations)
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**C**	DIFFICULTY	**C**	ORIGINALITY	**D**
PUZZLE QUALITY	**C**	EASE OF USE	**B**	DOCUMENTATION	**A**
TEXT QUALITY	**B**	VOCABULARY	**N/A**	HOLDS INTEREST?	**C**
GRAPHICS QUALITY	**B**	SAVE/RESTORE	**C**	VALUE FOR MONEY	**C –**

Dragon's Eye is a relatively straightforward and easy to play maze adventure style game. The objective is to help a good magician who is the enlightened ruler of the Seven Provinces by finding the bad magician's power-source gem (the dreaded Dragon's Eye) and returning before 21 variable-length days have elapsed. Failure to accomplish this task will naturally result in the complete ruin of the provinces. Since neither the Evil One nor the effects of his power are ever encountered, the real object is simply to enjoy the game and try for as high a score as possible.

The strength of this game is in its well done graphics. The single screen map of the provinces is nicely done, but it's the encounters with various monsters and the spell-casting graphics that will endear the game to the younger generation. The monsters are amusingly realistic and well-animated, and clever captions go along with the battle.

The challenge is minimal and there are no surprises from one game to the next, although there is a well-hidden degree of interaction between various aspects of the game. These depend largely on the weapon you choose, how you employ it, and the nature of various treasures you will hopefully uncover and covet. The pace of the game is unfortunately slowed in the "Examine-ing" of the different locations, because of Applesoft's speed and the liberal use of randomizing functions.

Nevertheless, kids will get a kick out of the *Dragon's Eye*; it should keep them occupied for hours, although a game takes only 30 minutes or so. Adults will also enjoy a game or two by dent of observing the battles, and following the graphics utilized in the spell casting; besides, they will have to help the kids learn to play because the otherwise excellent documentation was made difficult to understand in an attempt to make it "cutsey" by writing it in a poor man's version of Old English. Thus, hie ye to game's yonder chamber, and savor the rewards!

CROWN OF ARTHAIN

Company: Micro-Lab
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**C**	DIFFICULTY	**C –**	ORIGINALITY	**B**
PUZZLE QUALITY	**N/A**	EASE OF USE	**B**	DOCUMENTATION	**B**
TEXT QUALITY	**C**	VOCABULARY	**N/A**	HOLDS INTEREST?	**C**
GRAPHICS QUALITY	**B**	SAVE/RESTORE	**N/A**	VALUE FOR MONEY	**C**

The Crown of Arthain is a simple and straightforward adventure game which permits two players to compete against each other in a race to gain the Crown, or it may be played by one player. Either way, 20 levels of difficulty may be selected by a player, permitting handicaps to be used. Higher difficulties mean the monsters, of which there seem to be an unending supply, strike faster, and a bit more accurately. While sustaining less damage from each blow you land.

The degree of challenge is minimal. It is a matter of slugging it out, gaining experience and gold, finding magical devices to aid or avoid the unending combats, buying a map, finding a magic word, and slogging through a mountain castle's 32 rooms. Somewhere, you must find and defeat a randomly placed Dragon, having a considerably tougher hide than the other monsters, that guards the Crown of Arthain.

There are no puzzles to contend with; however, the graphics are nicely done, though a bit repetitious as far as the battles are concerned. Gray-beard solo adventurers may wish to complete the game, requiring a rather painless 45 minutes or so to map the castle; a couple of more youthful opponents will have a ball. Alternatively, Dad, using a higher difficulty factor, can easily spend a complete evening with his son while introducing him to the fun of an Apple.

KAVES OF KARKHAN

Company: Level-10 (Dakin5)
Language: Applesoft
Hardware Requirements: 48K ROM Applesoft/16K Card, Disk Drive

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	D	DIFFICULTY	C	ORIGINALITY	D
PUZZLE QUALITY	C	EASE OF USE	C	DOCUMENTATION	B
TEXT QUALITY	D	VOCABULARY	D	HOLDS INTEREST?	D
GRAPHICS QUALITY	D	SAVE/RESTORE	N/A	VALUE FOR MONEY	D

It's battle-your-way-out-of-the-dungeon time with KAVES OF KARKHAN, although the extensive documentation's storyline paints an interesting picture to the contrary. After you select your character type, a crew of 10 (chosen from 15) companions is selected. Each companion has a unique object to aid him in overcoming the traps of Maldamere, which block your way out of the caves that lead to the top of the mountain.

The accompanying characters are akin to "life points" and, should they be all killed during your quest, the world is doomed. Before you can enter the caves, however, you must play a brief game of anagrams. The reason for this phase of the game will never be known, but there are 33 different words from which the computer can choose. Once inside, you encounter some or all of approximately 30 traps, which are puzzles to solve by using the objects which you selected; if you didn't select the right objects, of course, you've had it!

The game plods relentlessly through 3-D representations of corridors that are replete with side halls, intersections, and stairways. The Hi-Res graphics are pleasant enough, but the sameness and non-mapability of the maze soon give rise to boring repetition. The trick is to keep moving by pressing the two arrow keys or the return key so that the random, often redundant, traps aren't forever plaguing you. After a very lengthy tour, with your relative success being marked by your climbing staircases, the game ends abruptly at a bier (which looks like a bird bath) and the words, "Congratulations, you found it!"

Unfortunately, the game doesn't measure up to the promise of the documentation which, while it is the best part of the package, fails to point out that pressing "S" will quiet the eternal clicking of one's movement. Kids may enjoy it once someone shows them how to solve a few of the puzzles which, while not too difficult, are a bit different.

DRAGON FIRE

Company: Level-10 (Div. of Dakin5)
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	C	ORIGINALITY	D
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	A
TEXT QUALITY	B	VOCABULARY	N/A	HOLDS INTEREST?	C
GRAPHICS QUALITY	B	SAVE/RESTORE	C	VALUE FOR MONEY	C–

Dragon Fire is a somewhat spruced-up *Super Dungeons*, a maze adventure form of game. The similarity is more than coincidental, as both were written by Rod Nelson. Unfortunately, this flashily-packaged version chooses to make no mention of the lower-priced ($24.95) and nearly identical *Super Dungeons*.

As an alter-ego character, you commence play by plodding your way through 10 repetitious dungeon levels which you may build yourself or have the computer choose for you. Trade experience is gained by conquering various monsters. You may eventually garner enough Constitution and Life Points to find and eliminate Salmadon, the winged-dragon somewhere in "Level 10."

A polysyllabic 30-page manual describes the fact and fiction of the game in great detail. The game may be saved, offers five degrees of difficulty, and is a neatly cleaned-up version of the original. Nevertheless, this is a game that children will enjoy, but which adults may find a bit tedious. On the other hand, if you already have a copy of *Super Dungeons*. . . .

WINDFALL

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B–	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	B–	EASE OF USE	B	DOCUMENTATION	B
TEXT QUALITY	C+	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	C+	SAVE/RESTORE	N/A	VALUE FOR MONEY	B–

An interesting and certainly a "current" game. Windfall puts the player in the position of an oil executive. You are able to set prices at the pump, deal with foreign suppliers, buy and sell stock and enter into collusion with the competition.

It is also possible to "watch" (utilizing graphics) activity at the dock as well as at the station. There is a time constraint (250 units or approximately 15 minutes of playing time). This figure is always displayed on the screen. The object of course, is to make as much money as possible. This program is a good way to learn a little about oil economics while playing a challenging and creative game.

TERRORIST

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	B–	EASE OF USE	B	DOCUMENTATION	B
TEXT QUALITY	C+	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	C+	SAVE/RESTORE	N/A	VALUE FOR MONEY	B–

TERRORIST is a game, unfortunately, right out of the headlines. In this program designed for two players one is the terrorist, the other represents government. The terrorist is given options of which group to represent, all with different names and attributes, then a choice of three scenarios: (1) hold a building and hostages (2) hijack plane or (3) build a nuclear device for blackmail.

After that it's up to the skills of the two players. A paddle game utilizing some Lo-Res graphics and sound, TERRORIST gives its players a better than average challenge and some interesting moments.

NETWORK

Company: Edu-ware
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	B–	EASE OF USE	B	DOCUMENTATION	B–
TEXT QUALITY	C+	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	C+	SAVE/RESTORE	N/A	VALUE FOR MONEY	B–

This is one of the few games where two players can play against the computer. NETWORK is intended to be a simulation of the process by which TV networks put their shows on for the new season. The game provides you with the format of the show (e.g., comedy, drama, documentary, etc.), the length of the show, production costs and a projected rating. The two players, using paddles, must then bid against each other as well as the computer (the third network) to buy the shows. The next step is to schedule them, then find sponsorship. The object is to maximize earnings. Sound complicated? It is a little, but if you've got two players (preferably Freddie Silverman and Faye Dunaway) and a few hours this program is not a bad way to pass the evening. Documentation is adequate though bland.

SANTA PARAVIA & FLUMACCIO

Company: Instant Software Co.
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	B–	ERROR HANDLING	B+
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B+	GRAPHICS	N/A	VALUE FOR MONEY	B

No, SANTA PARAVIA & FLUMACCIO is not an Italian vaudeville team. Better than that. You get to play the ruler of an Italian city-state and attempt to build it into a kingdom. It is a game for one to six players where they compete in overseeing the grain harvest, feeding the populace, investing in public works, and setting taxes high enough to raise income without strangling the economy. In other words, just about every socio/economic/agronomic ambition can be fulfilled, short of stomping grapes. As each player's city-state grows in stature, he/she/it receives a higher title until one ultimately wins by becoming king. Although some of the game is luck, mostly it is skillfully managing the economy, requiring you to stay on the *qui vive* (and avoid the grape).

EMPIRE I-WORLD BUILDERS

Company: Edu-Ware Services, Inc.
Language: Applesoft
Hardware Requirements: 48K Apple II or II+

Department: Entertainment
Sugg. Retail: $32.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	A
TEXT QUALITY	C	VOCABULARY	B	VALUE FOR MONEY	B–
GRAPHICS QUALITY	C	SAVE/RESTORE	C	HOLDS INTEREST?	C

Empire I-World Builders is an improved and enhanced version of Edu-Ware's earlier *Space II*. This version uses Hi-Res graphics, so-so shape tables, some animation, greater variety, and enough complexity to keep a player busy for some time.

World Builders allows you to develop a character, and then choose among three possible career paths: Planet Miner, Missionary, or Homesteader. Miners dig in 2D Hi-Res animation, creating tunnels (and cave-ins) in search of wealth. Missionaries must gain the trust of their followers, overcome assassination attempts, and successfully pass "tests" in order to rise up through the religious hierarchy. Homesteaders must husband the earth and their herds using high-technology farming, and be able to understand the rainfall pattern in order to prosper. Failure of all types of characters is a very frequent occurence.

Character generation requires, as do many of the other game phases, a repeated pounding on the space bar to stop the random generator. Even one's sex is random, and if you don't like the character that was created, tough! Characters enter the game at the age of 18, and, surviving mishaps, bad luck, disputes, space travel, and combat, may grow to a ripe old age, but longevity is as hard to attain as is a truly successful character. Characters may be saved, but to do so requires returning to the initial starting point of the game, which can be a number of moves away. Unfortunately, a true save-game feature is not provided.

Game play is straightforward, but demands that one keep the Player's Guide handy. This very complete guide must be referred to almost constantly to understand the shapes that keep popping up as well as their meaning. *Empire* has distinct phases in which the allowable vocabulary also changes. To the credit of Edu-Ware, they have included a complete, alphabetized list of the game's vocabulary together with each word's meaning; it would be nearly unplayable without this feature, but with it, it can be fun. At the frequent game phase changes, *Empire* is disk interactive, and for the most part is typically "Applesoft" slow.

The game concept is interesting and challenging, but its application could have been improved by better graphics, a means of determining one's state of health in phases other than combat, requiring less reliance on the Player's Manual, and more consistency. However, *Empire I* will will provide Sci-Fi fans a number of enjoyable hours of escapism into the future.

ADVENTURE GAMES

ADVENTURE

Company: Apple Computer
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A+	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	B
TEXT QUALITY	A	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A	VALUE FOR MONEY	A–

Apple's ADVENTURE joins the ranks of Rainbow, Programma, and Microsoft in releasing the original PDP-11 ADVENTURE; it is identical to Rainbow's, except that it runs slightly faster. Microsoft's and Programma's, being in assembly language, both run faster. The major clue, "Plover," given in Microsoft's version, is absent, as is the clever addition of the "Software Den," where micros, minis, and maxies are available free (??) for the taking.

As with the other Adventures, the computer represents your eyes and hands, dutifully responding to your instructions as to which way to go and when and how to manipulate the objects you will encounter. ADVENTURE starts simply enough at the "end of a road," describes in text form what you can see, and awaits your order to enter the house you can locate, or move off to the N, S, E, or W. With any kind of luck, you'll find your way to the enormous, beautifully described underground caverns. The many rooms and passages contain treasures for you to find, a variety of none-too-savory inhabitants to outsmart, and pitfalls to be discovered and dealt with. While violence and warding off monsters is not a major part of ADVENTURE, you can manage to kill yourself; the snares are not random between games, and once you learn how to deal with the trolls, dwarves, the dragon, the pirate, etc., you are better armed for your next inevitable bout with them.

ADVENTURE is highly addictive. Many hours can be spent in getting ALL the treasures and attempting to become a Grand Master, after which you are borne off on the shoulders of the cheering elves. Winning is perspectively in the eye of the beholder, but the score is accumulated as you progress. This game, which can take hours, can be saved at any point, although Apple's version requires a separate disk, while Microsoft permits two different scenarios to be saved on the game disk.

In summary, ADVENTURE is a great game, although we would have liked to see (especially since it is an Apple Computer Inc. release) more attention given to better documentation (e.g., with background data, scoring and playing tips).

ADVENTURE

Company: Microsoft
Language: Assembly
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A+	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	B
TEXT QUALITY	A	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A	VALUE FOR MONEY	A

The first message in Microsoft's Adventure game will be familiar one to seasoned Adventure players—

> "You are standing at the end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully."

The original Adventure was written in Fortran for the Digital Equipment PDP-11 series of computers by Crothers and Wood. Microsoft claims that this version for the Apple computer contains the complete game of the original.

The player will be confronted with 130 rooms, 15 treasures, 40 useful objects and 12 obstacles. There are 4 levels to the game and the game may be saved at any time. No graphics are used. Scores are given. The Classic Adventure Game and the best text adventure game to date. (See description in Apple's version above.)

ADVENTURE

Company: Adventure International
Language: Assembly
Hardware Requirements: 48K, Apple II or II +

Department: Entertainment
Sugg. Retail: $20.95/$14.95
Availability: 8
Disk or Tape: Disc/Tape

OVERALL RATING	A+	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	B
TEXT QUALITY	A	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A	VALUE FOR MONEY	A+

Scott Adams' Adventure International is the fifth company to release the original and classic ADVENTURE. Although the colossal cave and the game itself are essentially identical in all versions, this one has several unique and highly desirable features.

1. Lowest Cost: The disk version is $4 less than the least expensive competition and $9 less than the Microsoft version, which has been this reviewer's preference. A tape version at $14.95 is an excellent value, as instructions are provided for transferring the game to disk.

2. Response Speed: Unlike the other versions, which are highly disk interactive, Adams' is entirely in memory. The resulting response speed is nothing short of fantastic, a major advantage in this game.

3. Flexibility: The Apple and the Microsoft versions are protected; this version comes with an internal copy program for producing a DOS 3.2 backup copy. It also provides instructions on copying the disk to DOS 3.3, making it the only 3.3 version on the market. Also, NINE save-games scenarios can be saved onto the parent disk.

On the negative side, this version omits the significant word "Plover" from the Scenic View description, which may not have been in the original PDP-11 version, but is important. Similarly, there is not a warning provided either for the loss of battery power or an impending transition into a Master's Game phase. In these regards, the Microsoft version is more "playable."

In summary, and despite a near-saturated market, there is a definite place for this version of ADVENTURE. Every Apple owner should have a copy of ADVENTURE, and dyed-in-the-wool Adventurers having other versions should delight in the flexibility and speed of this version.

BIRTH OF THE PHOENIX

Company: Phoenix Software Inc.
Language: Assembly
Hardware Requirements: 48K Apple II or II + Disk Drive

Department: Entertainment
Sugg. Retail: $14.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	D	ORIGINALITY	B
PUZZLE QUALITY	D	EASE OF USE	A	DOCUMENTATION	A+
TEXT QUALITY	A	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	N/A	SAVE/RESTORE	N/A	VALUE FOR MONEY	C

BIRTH OF THE PHOENIX is a tutorial adventure game for the beginner. Three treasures must be uncovered and a special task completed successfully as part of this 25 room split-screen all text game. It contains elements common to the larger and more involved adventures, including a magic word, a six element maze, and the necessity of making a map.

The extensive documentation is excellent, describing game elements in clear and considerable detail. Methods of attacking all-adventure puzzle games are provided and numerous between-the-line clues are provided for many of the Scott Adams adventures. It is also a fine example of the way a good adventure should be structured, with clean, crisp displays, a bit of humor, well-error trapped routines, and the fast response of assembly programming.

With current adventure games tending toward being larger or increasingly difficult, newcomers to adventures encounter difficulty in finding an appropriate game on which to cut their teeth and/or justify their purchase on the basis of the enjoyment level. This is particularly true, since the earlier and generally easier games are now often difficult to find on the computer store shelves. At the price, this tutorial is an excellent value for anyone who has ever wondered what all the fuss is about over good adventure games. It is not, however, suggested for more experienced adventurers, who should breeze through BIRTH OF THE PHOENIX in less than an hour.

H.M.S. IMPETUOUS

Company: Adventure International
Language: Applesoft and Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**C –**	CONTROLABILITY	**B**	ERROR HANDLING	**B**
GAME CONCEPT	**C**	SKILL INVOLVED	**D**	DOCUMENTATION	**D**
CREATIVITY	**B**	CHALLENGE	**D**	HOLDS INTEREST	**C**
GAME DEPTH		GRAPHICS	**N/A**	VALUE FOR MONEY	**C**

HIS MAJESTY'S SHIP "IMPETUOUS" opens with apologies to C.S. Forrester, on whose famous character, Horatio Hornblower, the program's story line is based. The Apple's unique twist is that you are the Captain, in name and action; you must give the orders and accept (or suffer) the cumulative consequences of your actions, based on interactive dialog with the Apple.

The story leads ultimately to the "end" of your Royal Navy service in the mid-1800's. It is typical Forrester, with action, intrigue, and even a smattering of fair ladies present. It's well written and absorbing, but it is over within about 20 minutes. Of course, if you don't like the outcome, you can run through it again, making different decisions as you do so. There are about five major decisions, which have no bearing on the final outcome; not knowing which are which provides some of the challenge, as the decisions are relatively obvious, especially to followers of Captain Hornblower. There are three alternative endings, each with several variations on its main theme, ranging generally from Hero to Bum!

The vocabulary is adequate – better than most Adventure Games – and there are three Hi-Res pictures that are beautiful and well worth preserving via a graphics printer. On the other side of the coin, the game moves rather quickly, the challenge is rather minimal, and there is no great desire to take another tour after you've gone through it two or three times.

SOFTPORN ADVENTURE

Company: On-Line Systems
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**A –**	DIFFICULTY	**C**	ORIGINALITY	**A**
PUZZLE QUALITY	**A**	EASE OF USE	**A**	DOCUMENTATION	**C**
TEXT QUALITY	**B**	VOCABULARY	**B**	HOLDS INTEREST?	**A**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**C –**	VALUE FOR MONEY	**A**

SOFTPORN ADVENTURE is a moderately difficult but quite challenging adventure game with several unique twists. One is the bizarre concept of a game which requires finding and seducing girls. This all-text, split-screen fantasy resembles the Scott Adams' adventures, both in format and puzzle concepts. While not a large epic-length game (30 mappable locations), the puzzles generally require multiple operations and objectives to solve. A moderate degree of disk interaction calls in lower-screen descriptions with a tongue-in-cheek nature that would be PG-Rated, while user input can be X-Rated. Responses for some resolved puzzles are quite amusing and surprising.

The game incorporates both blackjack and slot machine games; however, their formats are not nearly as imaginatively applied in using the text page as are some of the other responses. An occasional fatal bug may occur just prior to giving the girl in the Disco the wedding ring – saving the game just prior to that happening is highly recommended. There is also a semi-bug associated with the Preacher - regardless of how much money you may have when its time to pay him off, his fee must be won from gambling proceeds after he asks you for it. The game can be saved on a DOS 3.3. scratch disk, but cannot be recalled from within the game, unfortunately, as one can easily get himself wiped out in some strange and clever manner.

Overall, SOFTPORN ADVENTURE is a fun game, presenting a challenge to even hard-core Adams' fans. It's also a good game on which would-be adventurers can cut their teeth, as it is an excellent example of a challenging but quite solvable puzzle game.

SCOTT ADAMS' ADVENTURE SERIES

Company: Adventure International
Language: Assembly Language
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $39.95 (3 games)
Availability: 4
Disk or Tape: Disk

OVERALL RATING	**A - C**	DIFFICULTY	**A - C**	ORIGINALITY	**B**
PUZZLE QUALITY	**A - C**	EASE OF USE	**A**	DOCUMENTATION	**C**
TEXT QUALITY	**B**	VOCABULARY	**B**	HOLDS INTEREST?	**B+**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**A**	VALUE FOR MONEY?	**A–**

(*Note on Grading*: This is a series of 12 games, and the rating above represents an average. The difficulty of Adventures 1-6 is a "C"; Mystery Fun House and the two parts of Savage Island rate an "A" level of difficulty; the Pyramid of Doom is a "B"; Mission Impossible, Golden Voyage, and Strange Odyssey were each given a "C." The Overall Rating of most adventures was a "B," with Strange Odyssey, Mystery Fun House, and Savage Island I leading the pack with two "B + "s and an "A – ," respectively. Savage Island II fared rather less well, given a "C.")

Scott Adam's ADVENTURE SERIES are puzzle games, each set in a different fantasy adventure scenario. The all-text display states what you can see and where the visible exits are. Two-word instructions lead you through a 20 to 30 call matrix, permitting manipulations of the various objects you encounter and leading to an eventual solution. The puzzle aspect, much more prevalent than in other adventure games, comes from using the objects to further your progress or avoid being killed. (Doesn't everyone know that a mummy lurching for your throat can be put to sleep by pouring water on his burning terra leaves? You did bring along the water, didn't you? The water was easy to find, but the empty object to carry it in was either somewhere else or hard to find.)

You may be able to solve a game in four to eight hours if you are lucky, clever, and take advantage of the "Save Game" command periodically to avoid having to retrace all the correct steps you made up to the point you were suddenly wiped out. If you enjoy resolving a myriad of interactive, thought-provoking exercises in deductive logic and have the patience of a chess master, it's easy to become helplessly addicted to those challenging games.

The program responses are exceptionally fast and often humorous. Hints and clues, when given, are always obtuse. There are no graphics or sounds, and little use is made of color. As of this printing, the series includes 12 full length adventures, all devilishly devious, delicately intricate, and deceptively involved. One hopes that Scott Adams' imagination will continue to produce more in the series and at his current level of quality.

ADVENTURES 1, 2, and 3

Adventure Land. This game has the distinction of being the first of the good puzzle-adventure games. There are thirteen treasures, above and below ground in this adventure's 29 mappable locations. Some treasures just lie around for the taking, but you may end up a scratching and screaming lunatic before you can truly deal with the bear. Overall, not too difficult, and a good introduction to the tougher games in the series.

Pirate's Cove. You must magically travel between a London flat and an island on your way to locating two treasures. It offers a smooth storytelling style, and its 25 locations are populated by such wacky characters as a talkative parrot, a mongoose that becomes a failure in life, and a drunken pirate who continually wanders off. The task of building a ship on the first island is a good example of a well done interactive puzzle. It is roughly as difficult as *Adventure Land*, in slightly different ways, and fun to play.

Mission Impossible. You must stop the saboteur from bombing the Nuclear Reactor. To complicate matters, you are a walking time-bomb, and the saboteur dies before you get very far. Three differently colored rooms must be entered in a specific sequence in this 21 location game. There's nothing new or particularly difficult here, but things pick up in the last of the rooms, and the game can have either an explosive or rather watery finish.

ADVENTURES 4, 5, and 6

Voodoo Castle. You are assigned the not-so-simple task of removing a curse from the Count Christo. The puzzle takes place in the 24 rooms, hallways, and darkened dungeons of Voodoo Castle. There is a Kachina Doll, a Juju Man, a book for removing curses, and much more. There are a few tricky spots, but the puzzle is solvable. It is very well done and fast moving, with the best story line in the entire series.

The Count. While this game has only 19 locations with which to contend, the new element of time has been introduced. Activities must be time-phased over several days and (parts of) nights in order to kill Count Dracula. It's slightly less complex in format than other games, but unique in that "things change" between night and day, and between successive days.

Strange Odyssey. You're on an alien planet in a damaged spaceship. You need to find five treasures, fix your spaceship, and return to home base. The first four treasures aren't too hard to find, once you figure out how to really move about in the 22 locations of this game. But finding the fifth treasure is a dog of a job, and it might be a pretty cold day before you get it, even after you learn what and where it is.

ADVENTURES 7, 8, and 9

Mystery Fun House. Spies have hidden secret plans that must be retrieved from a carnival Fun House, which consists of 37 locations and a rather messy four-element maze. *Mystery Fun House* is devilishly clever, fun to play, challenging to unravel, and difficult to bring to a successful conclusion. It is tricky to get in, easy to get thrown out, and more than one door may prove frustrating. It's this reviewer's choice for the best of all twelve in the series.

Pyramid of Doom. Thirteen treasures are scattered about in an unexplored Egyptian pyramid. This 26-location game starts out simply enough, but gets very difficult in spots; one treasure, for example, is in a logical spot where you cannot see it, while others are guarded by a stone-hearted Iron Pharoah. Have fun. And good luck with the Purple Worm!

Ghost Town. The locale is an Old West ghost town, complete with saloon, hotel, telegraph stations, jail, Boot Hill, and a piano-playing ghost. Again, there are 13 treasures to find. It's difficult in some phases, but unique in having a game within a game. Once you've solved this 39-location adventure, try doing so again by finding the optimum sequence of moves that will earn you the maximum bonus. In a typical Adams' switch, there is also opportunity for revenge on the Purple Worm.

ADVENTURES 10, 11, and 12

Savage Island, Part I. If you aren't already familiar with this Adventure series, then this game isn't the one to start with. This one is for aficionados who easily solved *Fun House* and casually breezed through *Ghost Town*! Adams' saga is more devious, treacherous, involved, tricky, and underhanded than ever. *Savage Island* is a long succession of extraordinary puzzles, and entails considerable retracing of steps in and around the island. The object is to obtain the one "password" to permit entry into Part II of this game.

Savage Island is more intricate than most games, and some parts move quickly and easily. The difficulty lies in getting to the easy part, which follows one of the toughest and most intricate sequences that Adams has yet conceived. To help you get into the tough part (before you reach the dinosaurs, UFOs, pirates, and force fields), remember that some sickly animals can be cured with a dose of salts.

Unfortunately, Adams has somewhat flawed a potentially perfect masterpiece by inhibiting the save-game feature during the early, surprisingly difficult part of the game. This, coupled with two very dangerous killers who appear at random (like the Ice Hound of *Strange Odyssey*), often prevents you from getting back to the place you had previously been in order to deal with your tormentors. The resulting frustration kills much of the interest and perseverance required to solve any Adams adventure. It can be done, however; and with the restoration of the save-game aspect, *Savage Island, Part I* could become the type of fun and challenging adventure enigma to lead this excellent series.

Savage Island, Part II. The second part of this game starts out with a bang, so to speak, while displaying the admonition that "Part I was a piece of cake compared to what you are about to go through." Playing was so tough that it required 30 minutes of struggling just for this reviewer to survive the first move, another 30 minutes for two more moves, and another three hours to get up to five moves! Note that Part I must be conquered in order to gain the necessary password to get into Part II (although the reason for this isn't clear, since the games have relatively little in common, except for the Pirate).

Golden Voyage. This game is another matter. It's one of the easiest of Adams' puzzle games almost to the end, and then it becomes only a little harder but a lot more interesting. You are given three days to find the potion required to restore the aged king's youth. It runs a bit slower than earlier games, and as a consequence the upper screen display is quite jerky in updating. The reason for these deficiencies may well be that Adams has used a common assembly language shell for all his adventures, resulting in certain execution inefficiencies, at least in this particular "patched-in" game.

In general, newcomers to Adams' puzzle games would be better advised to cut their teeth on earlier editions; although *Golden Voyage* is close to being complex enough to provide the necessary "training." Even then, the Savage Islands are almost too tough, except for the dedicated and somewhat masochistic expert adventurers.

ADVENTURELAND SAGA #1

Department: Entertainment
Company: Adventure International
Sugg. Retail: $29.95
Language: Applesoft & Assembly
Availability: 7
Hardware Requirements: 48K Apple II or II+
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	C+	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B+	DOCUMENTATION	A
TEXT QUALITY	B	VOCABULARY	B	VALUE FOR MONEY	C
GRAPHICS QUALITY	B	SAVE/RESTORE	A–	HOLDS INTEREST?	B

Adventureland Saga #1 is Adventure International's re-release of its original all-text adventure game which has been spiffied up with Hi-Res graphics, and much improved documentation. Several command option keys have also been added: the "Z" key toggles the graphics mode on and off, speeding the game considerably and producing an all-text version identical to the original release. They've added a four position save-game option, as opposed to the single position on the original version. It is a bit messier to use, however. The documentation is complete with at least a partial list of recognizable key words — a major breakthrough in adventuring.

As before, the object is to resolve the puzzles so that you can find and retrieve thirteen treasures, only some of which are easy to locate. A significant novelty (not evaluated), is that the "V" key toggles a Votrax (if you have one), to provide spoken feedback from the game. The same key was used, however, to toggle a printer and get a running hardcopy of the game text. A dump of the graphics is also possible, provided you have a Grappler or Microbuffer card and an appropriate printer.

The graphics are pleasant and colorful, but are often painfully slow if a number of shape-table objects must be drawn and filled in. "Inventory" is a particularly slow process, after the novelty of watching a graphical "bag-dumping" wears off. This recalls the old expression of "Z" before "I" (or is it "I" before E"?). The two-sided disk boots off one side, and eventually plays the game there. The flip side of the protected disk, through which one must pass, carries a plethora of AI promotions, including long demos of three games and a multi-screened graphical statement against pirating/unauthorized copying, complete with a dour-visaged Scott Adams staring balefully from the CRT.

If you have played the lower priced text version, you'll find the graphics add little to the enjoyment of the game. Personally, this reviewer preferred the original, as the graphics detract from the degree of imagination that is needed to be successful. If you haven't played the classic AI text adventures, then you'll have a treat in store — graphics or no, these games are a must for any serious adventurer.

TIME ZONE

Department: Entertainment
Company: On-Line Systems
Sugg. Retail: $99.95
Language: Assembly
Availability: 9
Hardware Requirements: 48K Apple II or II+
Disk or Tape: Disk*

OVERALL RATING	A–	DIFFICULTY	A	ORIGINALITY	B
PUZZLE QUALITY	B+	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	B–	VALUE FOR MONEY	B+
GRAPHICS QUALITY	A	SAVE/RESTORE	C–	HOLDS INTEREST?	B

Time Zone is a twelve-sided monster of a Hi-Res adventure game covering the period of time from 400,000,000 BC to 4082 AD. The mission is to use the Time Machine in your backyard to travel into the future to Neburon, deal appropriately with the evil Ramadu, and destroy his Ray Gun, which is about to demolish the earth. It is also necessary to return safely home in order to receive the accolades of friends and relatives and garner the Apple-ation of the Ultimate Adventurer. The graphics are excellent in detail and color, and their response time is much faster than earlier games, such that the disk interaction is hardly noticeable.

To achieve that rank requires traveling through 24 of the 39 accessible eras (although it can be done in 23). In each of the zones, there is usually one, sometimes two objects that need to be appropriately used to solve a puzzle — somewhere. The game clearly is something more than an evening's work; even knowing the optimum sequence of travel, proceeding directly to the destination, and then assaulting Neburon with all requisite objects, takes almost eight hours.

In the final analysis, only dynamite and matches are needed, and they aren't overly difficult to find. However, in order to apply them, some 54 other objects must be employed, of which 14 must be brought into Neburon to enable you to fight your way to the Ray Gun. You must use some objects more than once. While some 18 objects are expended, traded, or disappear, they are fortunately used but once; to further complicate matters, a few are not used at all, and a few (like a kite) are only set off to your detriment. The major problem is that none may be carried back in time

prior to its invention. Should you try to do so, that object will disappear forevermore, which can be most disconcerting to say the least. Even though it might be nice to blast a caveman with a ray gun, don't try!

Time Zone is a map maker's delight; the final product will literally fill a book. The maze content is just about right, with the final one in Neburon being a monster. Generally, the mazes, like the main maps, are rectilinear; that is, if you go North from one location, you can return there by going South. Most lands average 20 to 30 locations, with some going into the 50's and a few with as little as six.

Neburon is another matter. It's a game unto itself, with almost 135 mappable locations. Neburon's game content and plot make up perhaps the best single Hi-Res adventure yet; it is fast moving, cohesive, well written, and full of challenge — much better than other complete Hi-Res games and most ancillary lands of *Time Zone* which must be unraveled before mounting an effective offensive. Some players may enjoy hitting Neburon first, just to find out what items are needed. Although this is not a recommended procedure, it is indicative of the game's charm — if you get stuck in one place, there are other, independent places to work on.

As you might expect, there are many puzzles to be solved, and there is no help or hint option. Neither is there an abundance of humor or witty responses. Fortunately, the majority of puzzles are more frustrating than difficult or tricky. Several will drive you up the wall, largely because the vocabulary is just barely adequate. What hints there are are often contained in the lines of text below the picture, and the picture and text may be toggled back and forth by use of the RETURN. The command syntax is two words only, but the game does permit use of "Get All" or "Drop All" — a great time saver, and worth trying should the text note an invisible item (a bug encountered at four locations under some conditions on a Neburon disk).

There are a multitude of places, ways, and means of getting killed. Sometimes the explanation as to your demise suggests the action which would have avoided it, but usually death at a particular location is unavoidably consistent, regardless of the direction from which you enter or the action which you might take. A quick death is often a feature of an otherwise barren area, useless, that is, to the eventual solution.

PIRATE ADVENTURE SAGA #2

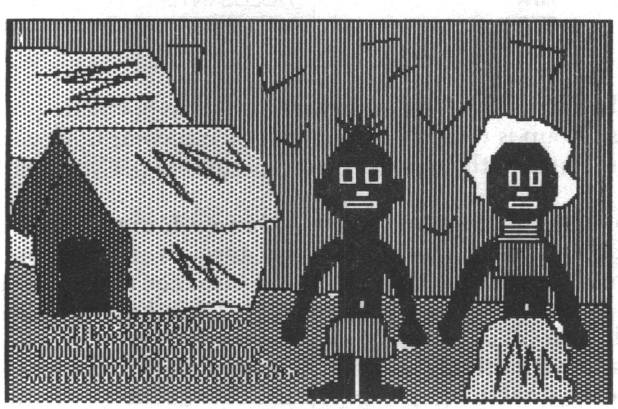
Company: Adventure International
Language: Applesoft & Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

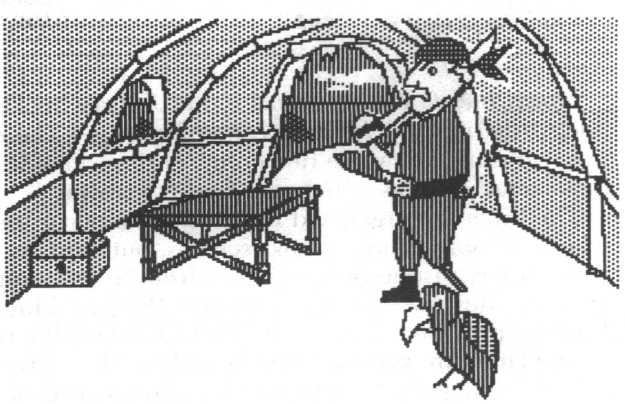
OVERALL RATING	B	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B+	DOCUMENTATION	A
TEXT QUALITY	B+	VOCABULARY	B	VALUE FOR MONEY	C
GRAPHICS QUALITY	B	SAVE/RESTORE	A–	HOLDS INTEREST?	B

Pirate Adventure Saga #2 is Adventure International's re-release of their second adventure. As is the case with *Adventureland Saga #1* (see above), *Saga #2* has been dressed up with Hi-Res graphics, and much improved documentation, with a the separate Hint Sheet thrown in to boot. In general, the commentary for *Saga #1* is equally applicable to *Pirate Adventure*.

The game itself is identical in all respects to the play of the original all-text version. There are two treasures to locate and collect, but getting them isn't quite as easy as it may seem. In conjunction with the hint sheet, and since *Pirate Adventure* isn't one of Adam's more difficult puzzles, it is especially recommended for beginning adventurers and young children whose parents are willing to "lose" them for several days.



TIME ZONE



PIRATE'S ADVENTURE

ZORK

Company: Infocom
Language: Assembly
Hardware Requirements: 32K, Apple II or II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A +	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	A
TEXT QUALITY	A	VOCABULARY	A +	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A +	VALUE FOR MONEY	A

ZORK is THE definitive adventure game. Only the original Adventure program and the Scott Adams' series are comparable in challenge and complexity. It has the monstrous scope, fundamental tenets and beautifully descriptive prose of Adventure, plus a complex enough "puzzle" structure to warm the heart of any Adams fan.

The scenario is familiar, but the specifics are totally new and different. Not surprisingly, one starts at a deserted house which leads (in hopefully short order) to a cavernous underground complex, replete with varied and sundry treasures, a hungry Cyclops, an audacious Thief, a testy Troll, enchanted items (like mirrors and certain knives), an underground lake, dam, and a river, to say nothing of the coal mine, chapel, maze, and on and on ad infinitum, even unto the very Gates of Hell.

The split-screen, all text and silent display is neatly formatted and scrolls very well. The vocabulary is out of this world; by far is the most extensive yet encountered. Compound and multiple commands are accepted and individually acted upon: for example, "Take all but shovel and pump. Enter the boat. Examine Scarab" is a valid, single command line. It will even answer a few abstract qustions such as "What is xxx?" and "Where is yyy?". Through it all, the speed of the game is satisfyingly fast. Well conceived system commands permit diagnosis of your state of health, control over the degree of text verbosity, enabling/disabling a printer from within the program, and saving a game's status (only one) to a separate disk.

ZORK will require at least the same amount of time (probably more) than was required to achieve a perfect score in Adventure. For those of fainter heart and lesser patience, Personal Software's well written documentation advises that a price list is available for various hints and maps. But whether you tough it out or not, the best news is that this is only Part I!

INVISI-CLUES FOR ZORK, PART I

Company: ZORK Users Group
Language: [Not Applicable - TEXT]
Hardware Requirements: [Not Applicable]

Department: Entertainment
Sugg. Retail: $9.95
Availability: 4
Disk or Tape: [N/A]

OVERALL RATING	C	DIFFICULTY	N/A	ORIGINALITY	N/A
PUZZLE QUALITY	C	EASE OF USE	N/A	DOCUMENTATION	A
TEXT QUALITY	C	VOCABULARY	N/A	HOLDS INTEREST?	C –
GRAPHICS QUALITY	N/A	SAVE/RESTORE	N/A	VALUE FOR MONEY	N/A

InvisiClues For Zork, Part I is one of three booklets put out by the ZORK Users Group on Infocom Software products, that is, *Zork I*, *Zork II*, and *Deadline*. The ZORK Users Group is totally independent of Infocom; however, they certainly know the fine points of those games. As the name implies, the booklet provides clues to get you "past those small hurdles which you find frustrating."

The hints are organized by physical areas of the game. Specific questions are posed within each area, some of which are non sequitur smoke screens, but most are legitimate statements of a puzzle. Several answers are often provided for each question, ranging from a gentle nudge to a more forthright clue, and to a succinct and specific answer. Initially, the hints are invisible; rubbing the boxed-in answer spaces with an A.B. Dick Latent Image Marker, provided with the booklet, develops the response as brown-black lettering on a yellow background.

The clues are accurate and complete; the extraneous "clues" are amusingly written, but may tend to confuse a player in the midst of a game. Even conquerors of *Zork* may learn something—there is a list of suggested activities and words to try to gain the last full measure of *Zork's* humor. This reviewer, a seasoned Zorker, re-entered the game just to try the 25% of those listings which hadn't been tried; and the responses to several made the journey worthwhile.

InvisiClues contains good artwork, writing, and printing, and reflects a very high quality production. That's where the rub comes in. At $9.95, it is expensive for the information you actually get. One wonders if a less rigorously packaged product, providing equivalent answers in a simple coded manner (without all the bells and whistles), could not have been produced at a lower unit cost. Such an approach might well have resulted in greater gross revenues, as it would then be priced in the "curiosity" range of *Zork* conquerors.

The ZORK Users Group also offers maps of each game at $2.50 each, a better buy for those who really want to solve the game in a meaningful, self-rewarding manner. Will power is needed to cap the Latent Marker before exposing all answers, more so than if a simple code key were provided. Except for the price, *InvisiClues* are excellent in all regards, entertaining in their own right, and definitely allow *Zork* to be solved almost too painlessly.

ZORK II

Company: Infocom
Language: Assembly
Hardware Requirements: 32K Apple II or II+, Disk Drive

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**A+**	DIFFICULTY	**B**	ORIGINALITY	**A**
PUZZLE QUALITY	**A**	EASE OF USE	**A**	DOCUMENTATION	**B**
TEXT QUALITY	**A**	VOCABULARY	**A+**	HOLDS INTEREST?	**A**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**A+**	VALUE FOR MONEY	**A**

ZORK II comes reasonably close to filling the rather large shoes left by the first "Zork". It continues the all-text, split-screen adventure, starting in the Stone Barrow where "Zork I" left off. There is another 400 points worth of treasures to find and tricky activities to accomplish before achieving the primary mission of becoming Master of the domain which is currently under the senile control of the Wizard of Frobozz. Whereas "Zork" was quite faithful to the original mainframe "Zork", significant changes have been included in ZORK II to the extent that it is almost a "new" game for players expecting the inclusion of the "second-half" of the mainframe game. The changes are revealed in the inability to return to the White House, although you may get a final glimpse of it, briefly and from afar.

ZORK II has the same outstanding command flexibility, wry humor, and word recognition of "Zork". A well-conceived addition incorporates eight game scenarios which may be saved and quickly recalled at any time, whether you've been killed or not. The overall interest-holding ability may not be as intense as the original due possibly to a certain jaded attitude acquired from too much quantitative adventure game-playing by this reviewer. The initial phase of the contest seems to drag a bit, until the Dragon is conquered and a riddle is completely solved. An especially interesting challenge, at which time a "save" is suggested, occurs at the point in which the demon is ready to do your bidding.

In comparison to "Zork", this game is somewhat smaller (by about 75 rooms) and has only one small but unmappable maze, which presents one of the more difficult puzzles. Even after you amass your 400 points, there is still a final puzzle to solve before you become a Superior Adventurer. At that point, you also learn of the pleasant surprise concerning the fact that ZORK III is coming! Additionally, there is a rumor that the next phase will follow the story line of the last part of the mainframe version.

DEATHMAZE 5000

Company: Med Systems Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $18.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	**C+**	DIFFICULTY	**B+**	ORIGINALITY	**C–**
PUZZLE QUALITY	**B**	EASE OF USE	**B+**	DOCUMENTATION	**C**
TEXT QUALITY	**N/A**	VOCABULARY	**C**	HOLDS INTEREST?	**C**
GRAPHICS QUALITY	**C**	SAVE/RESTORE	**N/A**	VALUE FOR MONEY	**B**

Deathmaze 5000 is a rather challenging adventure maze game. The maze consists of five levels. There are monsters, traps, treasures, and clues throughout the labyrinth. The object is to find the treasures and escape alive. Like most adventures, this one must be mapped. The Hi-Res graphic views, which are the fastest maze graphics we've seen, tend to look alike after continuous play. One gets lost easily. Our major complaint (and those of others that have tried the game) is that it is too easy to get killed. We inevitably encounter an invisible, decapitating guillotine and have to start over. Although I'm sure the objects found in the boxes have some use, one gets killed before their value can be determined. In summary, it is a frustrating challenge (maybe *too* frustrating).

KABUL SPY

Company: Sirius Software Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K Apple II or II+, Printer optional

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	B	ORIGINALITY	B
PUZZLE QUALITY	C	EASE OF USE	C–	DOCUMENTATION	C
TEXT QUALITY	C	VOCABULARY	C	VALUE FOR MONEY	C
GRAPHICS QUALITY	A	SAVE/RESTORE	D	HOLDS INTEREST?	C

Kabul Spy is a Hi-Res adventure that can't make up its mind whether to be a "serious" spy mission, or a treasure-collecting fantasy complete with magic words and Gruds. The mission is to cross into Afghanistan, search for, and find a professor captured in May 1981. It is possible to get him, and yourself, out alive, as well as to play for score and the five treasures that are found lying around.

The graphics of the 95 mappable locations are well-detailed and colorful. Between locations, the screen change time is fast, even though the disk is interactive; equally impresssive is the coloring speed in the frame. The command parser is also unusually good, similar to that of the *Zork's*, complete with printer output, and multiple command capability. These features work as advertised, but are not really needed as detailed descriptions are not involved. Nor does the vocabulary match the parser; responses like "Unknown Verb" (or noun) and "Nope" abound in response to synonyms to the specific word. Oiling a door and flying an airplane are challenges only in finding the precise two words. "Hints," at 10 points a pop, vary from dead give-aways to little help.

If only Sirius had also used *Zork's* save-game technique rather than the poor alternative that was chosen, the game would have been better. Ten scenarios may be saved, but an option for two-drive capability is very much needed. However, the resume capability is a disk-flipping nightmare. *Kabul Spy* is a two-sided single disk, and recalling a saved game produces a third side. Resumption of an in-process game requires almost a minute to cycle through all three sides. From a cold start, or after being killed off, almost two minutes are needed to run through four disk cycles. May Allah have mercy on your soul if you don't hit the specified buttons; there is no error trapping in this sequence!

This same disk-flipping is also required a minimum of six times during the course of a full game. They occur without warning; the options are: "do as told" or "start over." As to content, the beginning and late-middle parts are almost too easy — no options and zero puzzle content. Other phases have rather tough puzzles almost back-to-back. A clever, well-camouflaged surprise is hidden among the almost humorless balance of bland responses and several poor, minor mazes. Twenty seven objects are around, and most have a one-time use. Thus, property management is a big part of the game as only nine may be carried at a time. In four locales, a single, valuable response can be obtained from speaking with the characters, and two require doing so in a foreign language; so don't head into the bars without the "Rosetta paper." But several characters are mute, notably the professor. No amount of pleading, logic, threats or cajoling can elicit a single word from him, causing frustration enough to (unnecessarily) shoot the poor SOB. Then too (and in poor taste), it is necessary to shoot a mute priest.

ADVENTURE: BOOK OF HINTS

Company: Adventure International
Language: [Not Applicable—TEXT]
Hardware Requirements: [Not Applicable]

Department: Entertainment
Sugg. Retail: $7.95
Availability: 8
Disk or Tape: N/A

OVERALL RATING	C	DIFFICULTY	N/A	ORIGINALITY	N/A
PUZZLE QUALITY	C	EASE OF USE	N/A	DOCUMENTATION	B
TEXT QUALITY	C	VOCABULARY	N/A	HOLDS INTEREST?	B+
GRAPHICS QUALITY	N/A	SAVE/RESTORE	N/A	VALUE FOR MONEY	B

The BOOK OF HINTS provides clues to solving Scott Adams' first nine programs, up to but not including "Savage Island, Part I". True Adventure lovers should consider this nine page write-up as a last resort only. Fortunately, it doesn't ruin a game by telling you the answers outright; rather, it provides hints of varying specificity to help you figure out the puzzle for yourself.

The technique it uses is a simple code consisting of a series of numbers, with a list of words and numbers at the bottom of each page to permit "selective" decoding when you get stuck. Between eight to 18 clues are given for each game. One can seriously argue that the number of clues is not proportional to a game's relative difficulty; it does, for the most part, pick up most of the "hard spots" of each game. There are a few typographical errors, and some of the hints are overly obtuse. However, in general, it provided the thought-provoking hints that would have eased this reviewer's fight to solve the last puzzle in each game, and it did clear up a nagging "pyramidal" mystery — you CAN'T kill the Purple Worm!!

ADVENTURE IN TIME

Company: Phoenix Software Inc.
Language: Assembly
Hardware Requirements: 48K Apple II or Apple II + Disk Drive

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**A –**	DIFFICULTY	**C**	ORIGINALITY	**B**
PUZZLE QUALITY	**B**	EASE OF USE	**A**	DOCUMENTATION	**C**
TEXT QUALITY	**B**	VOCABULARY	**B**	HOLDS INTEREST?	**A**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**C**	VALUE FOR MONEY	**A**

ADVENTURE IN TIME is a novel adventure game which involves time travel, a helpful robot, and an interesting but not too difficult scenario of puzzles. The all-text, split screen display reacts quickly to commands, and is crisp and neat in the mold of Scott Adam's earlier games. The object is to locate the bad guy, Nostradamus, who is somewhere in time, and kill him before he can assemble the ultimate weapon and destroy the world.

The almost 60 mappable locations are split into five areas, four of which are set in different time periods. By using well-written descriptions, the player is partially guided through the sequence of locations. There are no mazes, but there are traps and puzzles that will keep an experienced player busy for several hours. Phoenix classifies their games in Novice, Rookie, Average, Experienced and Expert categories. Adventure in Time is labelled as being for Experienced Players, but it is by no means too difficult for beginners.

DEADLINE

Company: Infocom Inc.
Language: Assembly
Hardware Requirements: 32K Apple II or II +

Department: Entertainment
Sugg. Retail: $49.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	**A +**	DIFFICULTY	**B**	ORIGINALITY	**A**
PUZZLE QUALITY	**A**	EASE OF USE	**A –**	DOCUMENTATION	**A**
TEXT QUALITY	**A +**	VOCABULARY	**A +**	VALUE FOR MONEY	**A +**
GRAPHICS QUALITY	**N/A**	SAVE/RESTORE	**A +**	HOLDS INTEREST?	**A +**

Deadline is the first in a series of all-text mystery adventure games from the *Zork* bunch. Totally engrossing, you are seemingly pulled directly through the CRT, and right into the mansion with the suspects. You, as the Detective, are called upon to investigate the apparent suicide of a wealthy and philanthropic industrialist. There are no monsters, treasures, mazes, wizards, magicians, fantasy, or sound effects, just seven characters with you in a house with grounds having some 48 mappable locations. Sounds simple? Guess again! There are several tricky puzzles, a very involved plot, an abundance of well-written text, characters moving independently of one another (and of you), a second suicide/homicide of one of the characters (under certain conditions), and the possibility of twenty-five different endings, including your own early demise.

Like any good mystery, *Deadline* unravels slowly, and is complete with false leads and subplots. You have 12 hours to establish your case and resolve the conflicting issues. Don't try to do it all in the first hour; events transpire at specific times which will alter your suspicions or influence your investigation. Because of these events, a complete solution is not possible until early in the afternoon, even if you know exactly what needs to be done. Physical evidence, also time dependent, is hard to come by, despite a multitude of objects.

Regardless of which of four principal suspects you attempt to convict, it is necessary to prove the motive, opportunity, and means. When you believe you have enough proof, you may arrest your suspect(s). A summary letter advises you of the result, ranging from dismissal by the Grand Jury, to conviction by the Trial Jury. Some endings come with shocking suddenness, while others are quite a surprise or contain a strange twist or clue for your next attempt. While some are simply variations of others, there is one "complete" solution, distinguished by a three-screen analysis of the crime by the author.

The game suggests the quality, feel, and humor of its *Zork* predecessors, from which *Deadline's* flexible, multiple command parser has been adapted. The vocabulary and synonomous word recognitions are excellent, although there are a few "missing" words which a good detective would use; for example, Who, Why, When and Where. Then too, there is a fast sequence of events near one ending that is illogical, in that someone should have been able to be seen at a crucial point. Lastly, there is an obscure but fatal bug — don't shake a bottle known to be empty unless you have made use of the eight-scenario save/restore game feature.

The response time of the game is excellent, and the disk-interactive nature of the game is hardly noticed. *Deadline* will play on a 32K system, run faster on a 48K system, and really zip on a 64K configuration. While the puzzle quantity and difficulty level are moderate, the puzzles are quite involved and interactive, requiring more deductive logic than is usually called for in adventures. After seeing the many screens of possible responses and discriptions, perhaps the biggest single puzzle is, how did Infocom manage to get all that text onto one disk?

THE WIZARD AND THE PRINCESS

Company: On-Line Systems
Language: Assembly
Hardware Requirements: 48K Apple and Disk Drive

Department: Entertainment
Sugg. Retail: $32.95
Availability: 7
Disk or Tape: Disk (Protected)

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	A

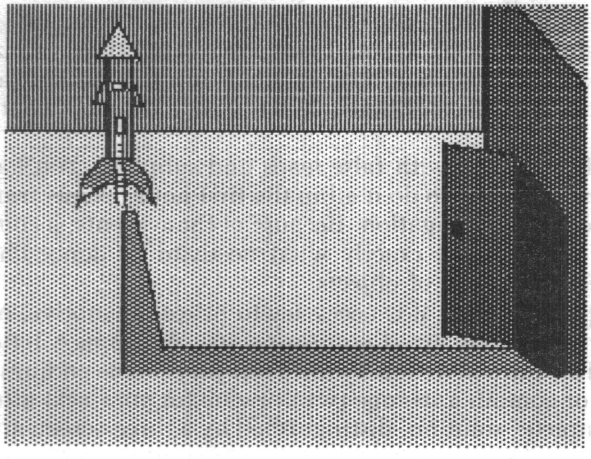
The WIZARD AND THE PRINCESS may well set a standard by which future adventure games will be judged. This game is much more involved, longer and complete than was On-Line Systems' initial Hi-Res adventure game, "Mystery House".

As an adventure game, the puzzles are much less involved and devious than are the Scott Adam's text games. There are several extremely difficult and illogical hurdles which must be overcome, such as at the very beginning which requires the crossing of several chasms. The Hi-Res graphics are excellent and, with the exception of the initial maze, are easily mapped. Color is effectively used, with various stylistical and well-designed shapes for the nearly 100 different primary pictures (not counting variations due to object presence).

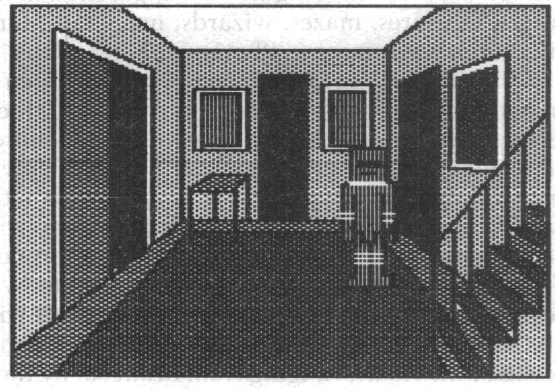
The object is to find and return a Princess, who has been bewitched by a wicked wizard and spirited away to his remote castle. It's tough just to get started. One must bypass a coiled snake; most rocks that you might conceivably use to kill it are loaded with scorpions. After that, other formidable obstacles must be conquered: a desert, a wide canyon, a wooded beach area, two tropical islands, a rickety bridge, a thieving gnome, a pirate, a giant, a wandering merchant, and an labyrinthean and magical castle. Along the way, various objects will be encountered; some useful, some not, and some possessed with strange powers.

The game is straightforward and easy to play. Up to 15 different positions may be saved on a scratch disk. Considering the unforgiving and dangerous nature of the terrain and its inhabitants, a frequent "save-game" command is highly recommended in order to catch your breath and regenerate your derring-do.

Both kids and adults will find THE WIZARD AND THE PRINCESS to be a very entertaining and a somewhat challenging game that will take some doing to successfully conquer. This adventurous rouser may cause some ego-bruising in a familial atmosphere, however, as the game-hardened precocity of youth will probably be the first to solve the problem in getting around the snake.



MISSION ASTEROID



CRANSTON MANOR

MISSION: ASTEROID

Company: On-Line Systems
Language: Assembly
Hardware Requirements: 48K & Disk Drive

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	B
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	B

The third of On-Line Systems done in Hi-Res adventure games, logically titled HIRES #0, continues in the high-quality tradition of "Wizard and the Princess." Your mission is to destroy an approaching asteroid before it collides with the planet Earth.

The elements of the puzzles are individually easy to solve. In fact, MISSION: ASTEROID is a very easy adventure game, at least right up to almost the very end! The designers let you get tantalizingly close to winning; successfully emerging victorious is another matter, however. It's a real bear to fit all the necessary elements together within the fixed number of allotted moves. The time limit, at five minutes per move, is of the essence. You're allowed a margin of error of only two moves. When you think you've solved the puzzles, you need to start at the beginning. Saving a game requires an additional move; not too fair. Also needed is a complete map and, preferably, a written sequence of moves you plan, as things can simply be easily overlooked with catastrophic results.

All in all, it's a well-done winner, totally straightforward and solvable, even though there may be times when you'll be convinced that you can't "get to there from here!"

CRANSTON MANOR [Hi-Res Adventure #3]

Company: On-Line Systems
Language: Assembly
Hardware Requirements: 48K Apple II or II + , Disk Drive

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	C

CRANSTON MANOR (Hi-Res #3) is actually On-Line Systems' fourth Hi-Res Adventure game. It follows the traditions, drawing form, and puzzle content of Mystery House, Wizard and the Princess, and Mission Asteroid. The object is to return 16 treasures from the multi-roomed Manor so that the town can be restored to its former glory (actually, the conclusion extends congratulations and designates you a Class 3 Adventurer!).

It's not hard to get in the Manor and find the treasures, but there are a few sticky puzzles to solve, and they get stickier if you don't read the Kitchen's description carefully on your first entry! The game is the same general size as Wizard and Princess, but except for the town and grounds (where there is relatively little action), CRANSTON MANOR is all indoors — upstairs, downstairs and basement. Mapping is necessary as there are several interesting interconnections. The inability to reliably restore or restart a game after being killed off is an aggravating program bug; the computer will be totally hung-up and requires powering-down in order to get back to any of the 15 save-game positions. One nice feature is the command "Init Disk" which provides a DOS 3.2 initialization process.

If you enjoyed the previous Hi-Res adventures, you will find CRANSTON MANOR enjoyable, but perhaps not quite to the same degree. There are few surprises, (excluding the fact that there are no bathrooms in the Mansion). There is a feeling of being somewhat crowded within this game, despite its size. Unfortunately, some of the imagination and freshness which so marked Princess is also missing.

SNOOPER TROOPS #1

Company: Spinnaker Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $44.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B+	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	C+	EASE OF USE	A	DOCUMENTATION	B+
TEXT QUALITY	N/A	VOCABULARY	N/A	HOLDS INTEREST?	B
GRAPHICS QUALITY	B	SAVE/RESTORE	N/A	VALUE FOR MONEY	C

An educational program that teaches an organizational approach to deductive reasoning along with a bit of map-making doesn't always have to be dull and tedious learning. Spinnaker proves the point with a new series of interesting educational programs called *Snooper Troops*. The first, a mystery called *The Granite Point Ghost* by Tom Snyder, is well suited to students in grades four through eight. Besides the general learning value that it imparts in the process of solving a mystery, it is great fun to play. In fact, many of the parents will become involved solving the mystery too.

The game, in Hi-Res graphics, takes place in the town of Granite Point. The mystery involves a family that has moved into a large mansion in a small town. For several weeks strange things have been happening late at night. Some say the house is haunted, but maybe someone is just trying to give the family a bad scare. Now that a valuable Siamese cat is missing from a locked bedroom, a Snooper Troop detective has been called in on the case. You play the detective.

The detective gets to drive around town in his "Snoopmobile," mapping the town as he goes, and taking statements from suspects. He can make telephone calls from booths to suspects, informers, or the infamous Mr. X. He can even snoop or search a suspect's unoccupied home.

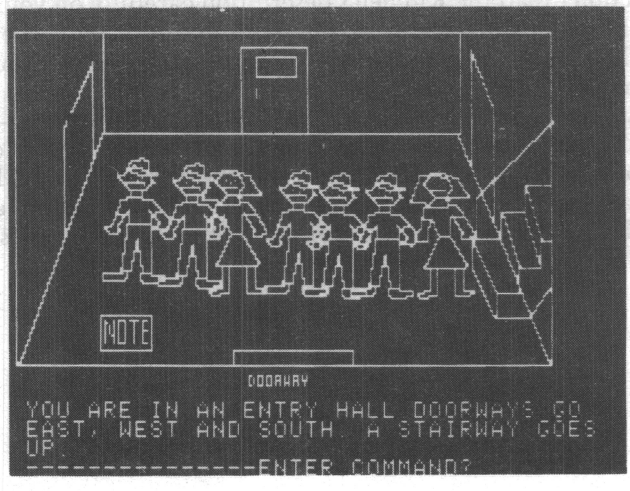
The house snooping is possibly the most enjoyable part of the entire game. The houses are dark, but you have a flashlight. When you enter, the screen displays the walls of the house and the clues along with question marks. You must move to the question mark and take a picture with your "Snoopmatic" camera, then exit without being caught. It's rare to be caught (you usually plan the search on a night when the suspect is known to be out); but if you are caught, you simply start over the following night.

Each of the suspects has three clues to give, each phone contact another three, and each home searched yields a final three. All are numbered, and you must write them down in your clue book. Additionally, there are special message clues that you get through the "Snoopnet" computer at headquarters, so you must hurry back before the end of the day to pick up your messages. Drive carefully and not to fast, for if you crash, you'll end up losing valuable time at the tow yard.

The mystery is very structured. Once you're ready to make an accusation, you do so. However, you must eliminate every other suspect by identifying the clue that exonerates him or her, and then name the means and motive of the guilty party. This is not a simple guessing game, but a serious challenge for the child.

The game is played on the keyboard using the A, W, D, X keys for steering, the S key for stopping, and the space bar for entering and leaving headquarters, phone booths, and houses. The space bar also turns the flashlight on and off and takes "Snoopshots." As our Snoopmobile travels around town, the screens change from one view to the next. Although the game isn't in real time, and is the same each time you play, a clock ticks off the hours and days of the week. Messages interrupt frequently with news and tips. Sometimes I think these messages are distracting, but this is true in all police and detective work. Incidently, there is no game save option.

The game is exceptionally well-done. It is cute, obviously appropriate for children, and not too difficult. Although this is not geared for a classroom environment, it certainly is useful for teaching the art of solving a mystery in the home.



MYSTERY HOUSE

MYSTERY HOUSE

Company: On Line Systems
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: DISK*

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	B	HOLDS INTEREST?	B
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	B

Mystery House is the first adventure game to appear in Hi-Res drawing form. All of the rooms and most of the objects are stored as compressed pictures on the disk. They are reconstructed as black and white line drawings upon entering a room. The adventure is loosely based on the Agatha Christie novel *The Ten Little Indians.* There is a treasure hidden in the house that you and the servants are searching for. The trouble is that the servants are being murdered off, and someone is trying to kill you before you find the treasure.

Use your wits to find all of the clues and the uses for many of the objects that you find during your search. The puzzles are not difficult, and with time, you will discover the entrance to the secret passage. Finding the treasure is fairly simple, but discovering the murderer/murderess and dealing with he/she is even more challenging. Even if you find the treasure, you are trapped in the house until you deal successfully with the killer.

This adventure is not a very long one. The mansion is only two stories plus. The vocabulary uses only two word commands, and tends to be obscure at times as in many of the On-Line adventures. The graphics, although not in color, add much to the previously all-text adventures. These drawings cannot be noted for their artistic merit, but they suffice. The game also features a save game option. All of these features make *Mystery House* a fun adventure for beginners and intermediate players alike.

THE CURSE OF CROWLEY MANOR

Company: Adventure International
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	D	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	D	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	D	VOCABULARY	D	VALUE FOR MONEY	D
GRAPHICS QUALITY	B	SAVE/RESTORE	A	HOLDS INTEREST?	D

The Curse Of Crowley Manor is a gory and humorless Hi-Res mystery adventure with the emphasis on the supernatural. As Inspector Black, you start in your Scotland Yard office (from which you cannot leave until the phone rings). You are summoned to Crowley Manor by an officer (later found gruesomely mutilated), to investigate the murder of Lord Crowley.

The graphics are distinctive, crisply drawn, and colorful, but are not overly artistic. From any Hi-Res display, the next keyboard entry flips the screen to an all-text page, which shows the current six item inventory as well as a description of the location and a list of visible objects (those which can be manipulated and don't appear on the graphics). This technique speeds the display time, but takes some getting used to since there is no text history as to what was just tried while searching for a valid combination of words. Any keyboard entry, even one resulting in the incomprehensible, all to often seen, "Huh?" flips you back to graphics. While the game's puzzles aren't difficult *per se*, finding a combination that elicits a response is frustrating and tough.

Crowley alludes to having a dynamic parser and an extensive vocabulary, making it my turn to say "Huh?" The parser does allow for multiple commands and full sentences; in some cases, it demands them. When facing a plywood wall, "Chop hole" gives the response, "Huh?" so try "Chop hole in wall," and "Get (don't Take) The Golden Key (not Key)." In effect, *Crowley* is a guessing-game where it is all too easy to get stuck at one location, looking for THE word combination. There are no alternative or parallel aspects to work on, look at, or from which to gain additional information. Fortunately, there's a good save-game feature minimizing the aggravation of oscillating between one command, getting killed, and having to restart. A single save-game position can be made to or called from the protected disk at any time, even after being killed off or torn apart.

A.I. should take a page from their *Pirate's Treasure* documentation and hint sheet, and expand the internal documentation which does list a few of the acceptable words. The disk also has another A.I. demo and a four color bar calibration page to adjust your set to properly reproduce the 108 colors claimed. After considerable cranking on the color, hue, and brightness controls, two TV's and a color monitor all had their turn to say, "Huh?"

ESCAPE FROM RUNGISTAN

Company: Sirius Software, Inc.
Language: Assembly & Applesoft
Hardware Requirements: 48K Apple II or II + (Contrary to documentation requirements of a 64K Apple II)

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C–	DIFFICULTY	D	ORIGINALITY	C
PUZZLE QUALITY	D	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	C–	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	B	VALUE FOR MONEY	C

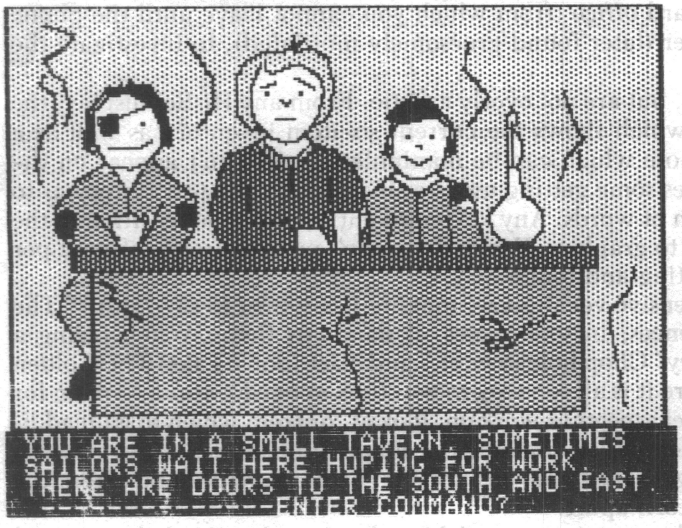
Escape From Rungistan is a B & W Hi-Res adventure that includes some arcade-like action. The object is to escape from a prison cell, and cross the border of the dictatorial Rungistan into the safety of Nuggyland. Naturally, a full scale search is immediately launched by the Rungistanees; apparently, if you aren't shot in the morning, they get to fill in for you in front of the firing squad. In effecting your escape, a number of easily solved puzzles will be encountered, some involving considerable time.

Generally, puzzles must be solved in a series before you can go on to the next of the 64 game locations. None interact with other puzzles, and usually the necessary object to solve a puzzle is found close by. Mapping is not really required, as there is usually only one possible direction to move. There are no mazes, and if there is more than one direction to move, the "map" is logical and symmetrical. In the arcade arena, the only one requiring any real skill involves skiing between seven or so sets of rapidly approaching trees.

There are two tough puzzles (though probably not designed as such). Given four numbers and a combination lock to open, the syntax requires the first of the two words to be "Use," with three of the numbers then entered without spaces, commas, or dashes. (Consider the "4R" as a hint, as opposed to a number entered into the computer.) The second is a guessing game, where it may be safely "predicted" that you'll not succeed by giving, using, or reading any object. You'll be on the right track with the latter, however. To complicate matters, you are allowed only a few chances (often just one) to input the correct words before seeing a two-line text screen dully announce that you have just been killed, or that you have won the game.

Compared to Sirius' first adventure, *Kabul Spy*, *Escape* is poorer as a game, but better in implementation and easier to play. The graphics are not as crisply drawn, but the game plays faster without the color-fill delay. Rather than major disk swaps occuring at illogical locations in the game (as far as the plot is concerned), *Escape* completes a logical phase, and only then does the disk swap occur. A single save-game position can be made to, or called from, the protected disk at any time. In the second and third phases, the player is given an option of restarting the game. Only if the phase is changed do you have to wait out a lengthy read cycle.

All in all, *Escape* is somewhat like Chinese food — filling but not satisfying. While there is animation and music, it's unfortunate that the game can't make up its mind as to what it wants to be when it grows up — an adventure or an arcade. Right now it excels in neither.



ULYSSES

MUMMY'S CURSE

ULYSSES

Company: On-Line Systems
Language: Assembly
Hardware Requirements: 48K Apple II or II + , Disk Drive

Department: Entertainment
Sugg. Retail: $34.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	B+	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	A	SAVE/RESTORE	C	VALUE FOR MONEY	C

ULYSSES is a Hi-Res adventure game that rivals "The Wizard and The Princess" in overall concept. Your mission is to find and return the Golden Fleece to the King, thereby gaining a kingdom of your own, plus 300 bags of gold and the designation, "Level 2 Adventurer". This mission is frought with dangers and obstacles (i.e. tough puzzles) before riding home on Pegasus, surfeited with riches.

ULYSSES is a better-conceived game than its immediate predecessors; it is also much harder to solve, in part due to a disturbing lack of recognition of many words, synonymous with text patterns which the computer will accept. The game also suffers from several bugs and logical shortcomings (e.g., range errors, fireproof wine, inconsistency when reentering rooms where an event or puzzle has previously occurred). The most flagrant anomaly is the carry-over problem from "Cranston Manor": the lengthy powerdown and reboot process required after being killed off. The 15 save-game capability on a scratch disk is great; scenarios may be made or called in at any time as long as you are alive; just don't get killed! (Hint: Save the game upon first encountering a major puzzle or obstacle, then restore the saved version at that position after three or four unsuccessful attempts to solve that puzzle; also, don't bypass the Isle of the Sirens, even though it is possible to do so).

There are almost 150 locations to be mapped, including many near-mazes in jungles, oceans, and forests. The majority of these are cleverly constructed to lead you to the next "correct" location. ULYSSES is long and difficult but generally maintains one's interest, provided one doesn't get disgusted with the rebooting requirement and a limited vocabulary.

MUMMY'S CURSE

Company: Highlands Computer Service
Language: Applesoft
Hardware Requirements: 48K ROM Applesoft, Disk Drive

Department: Entertainment
Sugg. Retail: $30.00
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	C	ORIGINALITY	C
PUZZLE QUALITY	B	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	C	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	B	SAVE/RESTORE	A	VALUE FOR MONEY	B

The MUMMY'S CURSE is a reasonably interesting Hi-Res adventure game with pleasantly done color graphics. The object is to find the solid gold burial mask and return it to the starting point. The mummy and a few fixed traps pose little difficulty once the game is mapped and understood; the puzzles are somewhat interactive, requiring considerable backtracking through the almost 100 locations.

Interest in the game is easily maintained, largely because of the excellent save-game implementation, which can be called in at any time from within the program, entailing considerably less than the full boot cycle. Even if you are killed off, you are given the option to keep playing, at the small cost of being returned to the starting point with all your objects intact. The game is acceptably fast even though it is disk interactive when moving from room to room. The vocabulary is very poor, but the game will usually inform you if it doesn't understand your response; if you approximate the desired action in different terms, the program will often respond with a very explicit clue.

Matters fall reasonably well into place once mapping of the 30 room pyramid "maze" is completed and its objects brought to bear on the semi-obvious puzzles; all objects are used once and, when you learn to make objects, the game is almost at its rather disappointing end. MUMMY'S CURSE has little in the way of a plot line and even less pithy humor, but all-in-all it rates as an average adventure suitable for beginning to intermediate players.

OO-TOPOS

Company: Sentient Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $32.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	DIFFICULTY	B	ORIGINALITY	B
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	D
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	B
GRAPHICS QUALITY	N/A	SAVE/RESTORE	B	VALUE FOR MONEY	C

OO-TOPOS is a futuristic adventure game of the same conceptual nature as "Zork" and "Adventure." This all-text game is larger than either, having some 150 mappable locations and almost 50 objects to manipulate and carry around. The science-fiction story line and descriptions are entertaining and attention holding, but not up to the classic and expansive prose of "Zork." The object is to escape an alien planet and return to Earth after reassembling the widely scattered parts of your spacecraft and finding the various treasures which had been in the spacecraft at the time of capture.

The game is lengthy and relatively difficult, largely because of its large size and number of discrete objects. The puzzle content is moderate, at best, and generally of a one-object-on-one nature, with the single exception of actually building the spacecraft once having found all of its elements. Only experienced adventurers are likely to have the patience to fully map OO-TOPOS and its five mazes, although such exploration (in all ten directions) is mandatory to the solution. In general, the maze approach is overdone; however, the jungle maze is a thing of beauty, perhaps the best maze yet to be seen. This maze is highly logical in its final-mapped version, but it is difficult to solve initially and is constructed in such a way that one may not realize he is in a maze for a number of turns.

OO-TOPOS is an excellent initial achievement for author Berlyn, but it lacks the sophistication, polish and ease of play found in the implementation of "Zork." The scrolling single-screen text display could be vastly improved by a split-screen version showing the number of moves and current score. Claims of a large vocabulary notwithstanding, the effective vocabulary is rather limited, often demanding a specific word to operate after a Webster-validated response. The all Applesoft game is agonizingly slow and extremely disk interactive, often with lengthy delays in responding. The game status may be SAVEed at any point or via a QUIT option; it cannot be recalled without rebooting. Scoring is a complete mystery, since neither the criteria nor maximum score are stated. Following the construction of the ship, the end game is as disappointing as it is tedious in the loading and unloading process in a phase that doesn't definitively end.

Although there are several non-fatal but irritating program bugs, OO-TOPOS is an above average and challenging adventure game, with excellent scope and storyline. It is not destined to be an adventure classic, however, but would have come closer with faster assembly subroutines, some debugging, and a crisper screen format and conclusion.

NOTE: Sentient Software has advised that the bugs in the version reviewed above will be corrected in an update. The update will be available in stores soon, and will also be exchanged by mail at no cost to buyer's of disks having "Cold Room" Boxes which cannot be handled.

MACES AND MAGIC [Series of Three]

Company: Adventure International [Chameleon]
Language: Applesoft
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $94.85
Availability: 6
Disk or Tape: Disk [2 sides]

OVERALL RATING	D	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	B	EASE OF USE	D	DOCUMENTATION	B
TEXT QUALITY	B	VOCABULARY	D	VALUE FOR MONEY	C
GRAPHICS QUALITY	N/A	SAVE/RESTORE	D	HOLDS INTEREST?	D

The Maces & Magic series is a cumbersome family of three all-text games with a heavy maze-adventure flavoring. Two double-sided 3.2 Muffinable disks are in each package. Two sides are for the Apple, and the other two are for the TRS 80. While two drives are not really needed, they do slightly shorten the more than 3 minute boot cycle required to start or restart a saved game.

The games are similar in concept to the *Eamon* and *Sword Thrust* series. The character generator, weaponry, and armor are common to all scenarios. Thus, a character "grown" to riches and strength on one game can be used to enter the other games. The generation of a suitably strong character requires diligence and a lot of luck; or, alternatively, looking into the program to create a super-hero so the adventure aspects can be enjoyed without continually getting "killed off" by the random and the fixed monsters. Even then it's quite easy to get wiped out by traps and wrong guesses.

1. *Balrog Sampler:* Not available for review.

2. *Stone of Sisyphus:* Set in the familiar underground caves, *Sisyphus* offers several interesting puzzles and a straightforward exercise in mapping. A total of 695 points in collected treasures and deeds await the explorer. A Muffined set of DOS 3.3 disks had several fatal "Error 0" and "End of Data" errors in the Eastern area of the game.

3. *Morton's Fork:* A much more interesting and expansive scenario, *Morton's Fork* is set in an ancient wizard's castle, where, uniquely enough, a party is being held. The task is to explore, map, get rich, obtain the 1492 possible points (there are several big-point swingers), and, of course, to survive. The puzzles are clever and imaginative for the most part, though some have more than passing similarity to those in *Sisyphus.*

By current standards the operating system for these games is awkward and archaic, requiring numbers to be entered to effect actions and movement. Worse, the numbers are inconsistent: one time North may be designated as #1, and another time, #3 or #2. Adventurers used to *Look Boulder* will get an inescapable "(L)eave Items Carried" menu. The vocabularly is very limited, leaving little to do except enter numbers, wait to watch slow running screens filled with text appear, and enter a number for a choice of action.

The challenge of the *Mace* series is significantly lowered by the cumbersome and slow command requirements, the endless (and unnecessary) need to hit "Return," the very nature of disk interaction, the extreme difficulty in developing a survivable character (without cheating), the interminably slow boot cycle, the relative ease of getting "killed," and the inability to save a game without exiting from the program. (Suggestion: To restart a game, the booting time can be avoided by "Reset" and "Run".) On the plus side are the not too hard but cute and interesting puzzles, cleverly written text and playing options, and, best of all, the possibility of rewriting the program to suit the player's fancy. All in all, it is unfortunate that these potentially fine game scenarios are not on a par with Scott Adam's earlier Adventure International games.

QUEEN OF PHOBOS

Company: Phoenix Software
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	A –	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	C +	VALUE FOR MONEY	B +
GRAPHICS QUALITY	A	SAVE/RESTORE	A	HOLDS INTEREST?	A

Queen of Phobos is a black and white Hi-Res adventure game in which the object is to board a long-lost Martian spaceship and retrieve the legendary golden mask of Kuh-Thu-Lu. You must find it and escape with it before one of the four looters (who destroy your spacecraft when they board) can ambush you. If you're clever enough, you can (and should) get them before they get you.

The puzzle content is interactive, of sufficient quantity to maintain interest, and is amenable to a logical solution (except for guessing which of the many weapons will work on each of the looters). The disk interactive graphics are drawn very rapidly and are toggled off by pressing Return and entering an all-text split-screen mode. This mode is nearly instantaneous, and is recommended if any nut (like this reviewer) wants to map out the 100 + stateroom maze, which must be traversed. Properly mapping this game can be as interesting as solving it; "North" is always in the direction of the center of the ship — which is round. If you are not inclined to mapping, however, a map through the maze is available for the finding.

While several key objects are always found in fixed locations, the majority are randomly placed for each new game. The objects are generally found in the 39 room periphery, and none are ever in the maze; should the randomizer place a key object in the ship's five room central area, the game can become involved. To avoid this problem, consider making several "new-game" starts to develop a map of the periphery and a list of the randomly placed objects. Until that is done, there is little need for the save-game feature, which will save one game to a scratch disk, and is unusually fast in the saving and restoring process. The vocabulary is adequate for the game, with clear responses to unknown words.

Queen of Phobos continues Phoenix Software's fast acting, nicely paced adventures, and is accurately rated by them as being of average difficulty. However, it is above average in quality and implementation. Beginners will find its logic easy to follow, while experienced adventurers will spend an enjoyable Saturday in solving the puzzles and drawing the complete map.

CASTLES OF DARKNESS

Company: The Logical Choice
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $34.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C –	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	C	EASE OF USE	C	DOCUMENTATION	D
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	B	SAVE/RESTORE	A	VALUE FOR MONEY	C

CASTLES OF DARKNESS is an uninspired and humorless Hi-Res adventure game that moves ponderously and develops even more slowly through its 85 locations. The object is to overcome the might of the evil wizard, Grimnacht, by discovering the power behind his curse. There are 85 rooms in two castles to be explored; some with treasures, others with fixed-position monsters or clues, and many with nothing at all. When all is done, you will also have amassed 200 points and incurred sore fingers from constantly typing all the letters of the words like "explore" and "inventory". Finger fatigue isn't helped any by having to search for acceptable verbs that are recognized by the game, despite its contention that there is a 200 + word vocabulary.

There is a degree of animation and an occasional spoken work, like "beware", but the graphics leave much to be desired: rooms are almost unchanging in form and content while objects are of microscopic size, requiring constant disk interaction and at least 13 seconds to move from one location to the next. The option of saving up to 7 games on the disk at any point during play is nice; however, this feature is something of an overkill, in that one really has to work at getting annihilated. On the other hand, a saved game can only be restored at the very outset of the contest, after going through the lengthy startup cycle. The worst feature of this adventure is that on entering each new location, five lines of text are displayed at the bottom of the screen, one more than can be directly seen; thus, an "ESC" is needed to flip to the text mode in order to read the description.

The combination of slowness, limited vocabulary and response choices from the computer overshadow a rather good puzzle design. A clue sheet can be purchased for $2.00, but a list of recognizable verbs would help much more!

ALKEMSTONE

Company: Level-10 [Div. of Dakin5]
Language: Assembly
Hardware Requirements: 48K Apple II or II + Disk Drive

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	D	DIFFICULTY	A	ORIGINALITY	D
PUZZLE QUALITY	A +	EASE OF USE	C	DOCUMENTATION	B
TEXT QUALITY	B	VOCABULARY	C	HOLDS INTEREST?	D
GRAPHICS QUALITY	D	SAVE/RESTORE	C	VALUE FOR MONEY	F

ALKEMSTONE is a dull and repetitious trek through a 3-D maze consisting of tunnels in which a search commences for widely scattered clues relating to the location of the fabulous gem, ALKEMSTONE. The object is to find the clues, piece them together, deduce the location of the ALKEMSTONE, be the first to do so, and win $5000 as a justifiable reward for risking, figuratively, life and limb.

The sonics and uninspired graphics representing the 3-D tunnel are straight from "Kaves of Karkhan", an earlier Level-10 game. The High Resolution shape tables used for the lettering and figures presented in the clues are excellent, however. As might be expected, deciphering and interrelating the clues are difficult; it might even be fun if they could be found without spending hours plodding around the maze, even at the expense of foregoing the gimmicky monetary prize. Mapping is mandatory, even with the Control-P function, which shows where one currently is located within the maze. The clues encountered on the walls are situated in fixed locations for a given game, and represent the only valid way of precisely determining one's location.

The game is simple to play, since there are only four direction keys and a single forward key at your disposal. The documentation is presented in the form of a nicely written short story describing the background and object of the game, which initially sparks a degree of interest that is soon lost when the game is booted. The true challenge consists of maintaining one's staying power, although some may consider the lure of the prize as the obvious goal. Others may consider that the $5000 stipend is an appropriate hard-earned recompense for staying with ALKEMSTONE through the clue finding process.

CHAMBERS OF XENOBIA

Company: Avant-Garde Creations
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $15.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C –	DIFFICULTY	D	ORIGINALITY	D
PUZZLE QUALITY	D	EASE OF USE	B	DOCUMENTATION	D
TEXT QUALITY	C	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	C –	SAVE/RESTORE	B	VALUE FOR MONEY	C

The CHAMBERS OF XENOBIA is a modestly priced, unpretentious adventure game which has only limited challenge. Thirteen treasures await you in the underground cavern, the majority of which are guarded by an unsavory critter who you must kill to gain the reward. Two minor puzzles, consisting of finding and appropriately using a key and a magic word, do little to offer a true challenge. A third "puzzle" consists of finding the right word in the program's limited vocabulary to use in order to access one of the treasures. The protected game disk is 13 sector (DOS 3.2.1), and while the internal documentation is adequate to play the game, a full-page of poorly and confusingly written text is provided to tell you to boot your Basics disk first.

Redundant sounds and the use of the same Hi-Res picture neither help nor hurt this game. Experienced adventure players will find it a pleasant enough way to pass an hour or two if their expectations aren't too high; the game is easily mapped, offers little reason to play a second time, and contains no unique twists or anything new. On the other hand, it's easy to play, doesn't bomb, is non-devious, and low enough in price to attract neophyte adventurers and parents with younger children who are starting to use the Apple.

EMPIRE OF THE OVERMIND

Company: Avalon Hill
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C	DIFFICULTY	A	ORIGINALITY	C
PUZZLE QUALITY	A	EASE OF USE	B	DOCUMENTATION	D
TEXT QUALITY	C –	VOCABULARY	C	VALUE FOR MONEY	D
GRAPHICS QUALITY	N/A	SAVE/RESTORE	F	HOLDS INTEREST?	A

Empire Of The Overmind is an all-text fantasy adventure of the same genre as its predecessor, *Lords Of Karma*, but it is much more extensive and complex. There are 87 mappable locations, many of which are totally dark until you call up the means to light an object. The puzzles are tough, and often you get to within one move before being wiped out. The object is to find and destroy Overmind (a golden sphere), thus winning the love of the enchanted Princess, whom you had previously met while trying to cope with the sundry critters and traps. When this is accomplished, the game ends with a bland page of text, rather disappointing after all the work required to get to that point, and with all the possibilities for a zippier conclusion. The game itself abounds with many objects, helpful people (such as a Dwarf), and several useful magical items. Clues, and the right context in which to use them, are found in the "Rhyme of the Overmind," detailing the history and objective of the game in verse.

While the Rhyme is fairly useful, the Instruction Sheet provides no guidance — except for an easily missed but important comment that three, rather than two words may often be required. The game responds to the first three letters of a word, with the second word often having to be an adjective. To use an object in one's inventory, the command "HOLD" for that object must first be entered, or you'll spend 20 minutes trying to fill the waterskin.

As sold, the game is unacceptable because it lacks a documented save-game option: it is impossible to solve *Overmind* without such a feature. Having to restart a game after investing several hours in its development can be overcome by a save-game capability derived from the cassette instructions. First, MUFFIN the program to DOS 3.3; when you desire to save, enter the following: RESET;CALL-151;BSAVE (filename), A$8000, L$1000. To restore a saved game: boot normally; RESET; BLOAD (filename); CALL-151; and, finally, 800G. Currently, the documentation provides extensive sections on how to load and operate the TRS-80 or Atari versions, and the cassette version for the Apple.

Overmind is written entirely in assembly language. While it isn't disk interactive, it is slow, taking 5 to 12 seconds between commands. All in all, it is a tough and challenging adventure, but is poorly formatted, slow running, and with a minimal vocabulary. The flashy Avalon Hill packaging does at least contain a disk (DOS 3.2 with dual DOS booting), rather than a cassette. Perhaps the next generation will include acceptable instructions.

MADVENTURE

Company: Microlab
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A	VALUE FOR MONEY	A

MADVENTURE is Microlab's first adventure into all-text puzzle games, and it's a dilly! Using the split-screen format and game concept of the familiar Scott Adams' series, MADVENTURE is perhaps the most challenging set of puzzles yet to be combined into one program. It is some three times the size of the typical Adams' puzzlers (i.e., 64 mappable locations), includes a just-adequate vocabulary for its size, and is pleasantly fast in all responses.

The object is to get 15 treasures to the theater lobby and visit those locations which contribute points to the maximum of 400. The next objective is to accomplish the above in less than 185 moves. This allows you to accept the challenge presented by Microlab, consisting of providing the game with the "seat number" assigned by the program upon successfully completing the task.

MADVENTURE is not recommended for beginning or intermediate puzzle-game players. Even very experienced campaigners will be driven up the wall, since clues to solving the game are very scarce, to say the least. Even clues provided in the initial aspects of the game require careful thought in solving the specific challenge (if and when you do find them). Numerous puzzle elements interact so that if they are not performed in the proper and precise manner, that particular game is worthless for help in unravelling the scenario.

MADVENTURE can be maddeningly addictive and highly aggravating, but it is solvable. In fact, it can be solved in 181 moves and the Ruby captured forthwith. The system will also promptly load a saved game from a scratch disk in case you end up in a room without any exit or manage to get killed off. In summary, this is a super-tough, crisp game for the puzzle-nut who thinks he can solve anything.

TARTURIAN [WIZARD II]

Company: Highland Computer Services
Language: Applesoft w/Binary Linking
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C–	DIFFICULTY	C+	ORIGINALITY	C
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	C–
TEXT QUALITY	C	VOCABULARY	D	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	B	VALUE FOR MONEY	C

If you liked Wizard I, then you should like its successor even more. WIZARD II uses the same graphics form, cast of characters, four-program format and basic objectives.

Basically, only the map and treasure names have really changed and a big baddie, the Tarturian, has been added. The game's vocabulary is nearly as limited as its predecessor's, but its scope has been expanded by some additional system commands, new weaponry, more complex character usage, and much less obvious clues. Indeed, the clues have become so thin that it's almost a guessing game as to which character should try what! Hence, kids may well find it quite challenging while adults may get become somewhat bored.

OLDORF'S REVENGE (WIZARD)

Company: Highland Computer Services
Language: Applesoft w/binary linkers
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C–	DIFFICULTY	C	ORIGINALITY	C
PUZZLE QUALITY	C	EASE OF USE	B	DOCUMENTATION	D
TEXT QUALITY	B	VOCABULARY	D	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	B	VALUE FOR MONEY	C

WIZARD is an uncomplicated and straightforward adventure game. The objective is to find all the treasures within the four linked but otherwise independent game segments. The game utilizes black and white Hi-Res drawings as you traverse your way through the dungeon.

The game will provide a modicum of challenge in mapping the environment, as all areas must be covered to locate the widely scattered treasures. While this adventure does respond to a very limited vocabulary, it occasionally displays some very frothy text statements (i.e., for a perfect score, "You are a grand exalted whiz bang all time poobah, and a nice guy."). After the first phase, a save-game option is available, which should be used if the player still has four "lives" available for each of the 7 characters he may assume. The balance of the game's challenge lies in proper managing and usage of these character types.

All in all, WIZARD is satisfactory for adventure game beginners, while it can serve to "pass time" for devotees; however, don't confuse it with "The Wizard and the Princess" as far as graphic excellence or thought-provoking challenge is concerned.

PALACE IN THUNDERLAND

Company: Microlab
Language: Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	A	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	C
TEXT QUALITY	B	VOCABULARY	B	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A	VALUE FOR MONEY	A

PALACE IN THUNDERLAND is Micro Lab's second all-text adventure game, following the successful "Madventure." It is slightly smaller than "Madventure" and not quite as difficult, but will still give experienced adventurers a tough time. The vocabulary is quite adequate and responds quickly, often with humorous answers.

There are eight treasures to be found and several very interactive puzzles to resolve. The story follows a consistent Alice in Wonderland theme, with fewer "red herrings" that serve no purpose other than getting in the way as objects which lead you down a primrose path. Clues abound; but which clues are associated with other clues, and in what sequence, can make you feel like a participant at the Mad Hatter's tea party. In this regard, the game is excellent, as there are several viable alternatives to individual puzzles, but only one which will permit a perfect game to be achieved.

PALACE IN THUNDERLAND can be handled by beginners, but it will take time before they find the light. More experienced players will require at least one good weekend to get through it. Micro Lab's adventures are professionally done and are quickly gaining in popularity. This reviewer, for one, is anxiously awaiting the next one! Meanwhile . . . I'm late! I'm late! For a very important date! Now where's that Hi-Res Hobbit hole?

CREATURE VENTURE

Company: Highland Computer Services
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C–	DIFFICULTY	C	ORIGINALITY	C
PUZZLE QUALITY	B	EASE OF USE	C	DOCUMENTATION	D
TEXT QUALITY	C	VOCABULARY	D	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	C	VALUE FOR MONEY	C

CREATURE VENTURE is an adventure-type program similar to but somewhat better than its predecessors, "Wizard I" and "Tarturian" (aka "Wizard II").

The objective is to enter and explore an inherited mansion, deal with its inhabitants, and find the treasure, which is in two parts. Once having found the first part of the treasure, you enter a Master's Game, made more "difficult" by no longer affording the save-game feature of the initial phases.

The B&W Hi-Res graphics are the same form as the other games but are generally "cleaner", with some well-done animations and shape usage. Unfortunately, the other shortcomings of the earlier games are also still present in full force; the extremely limited vocabulary is totally inadequate, and the general guessing game nature seriously compromise an otherwise interesting adventure.

The clues are either too much or too few; some puzzle aspects are quite good, others are very poor and there is absolutely no "feedback" from handling objects as to potential usefulness. For example, batteries are easy to find, but the flashlight is somewhat more difficult to locate. When both are in hand, you assemble them, providing you with light for the second phase of the adventure. (Hint: don't bother going on into the second phase, the entrance for which isn't too hard to find, unless you find the shovel in the overdone maze).

Portions of the game are interesting and rather challenging, but for adult adventurers it rapidly becomes very boring because of its poor word recognition and general handling characteristics. As with Highland's other games, the kids will most likely find it interesting.

THE INFERNO

Company: The Software Emporium
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	D	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	C	EASE OF USE	D	DOCUMENTATION	B
TEXT QUALITY	C	VOCABULARY	D	HOLDS INTEREST?	D
GRAPHICS QUALITY	N/A	SAVE/RESTORE	D	VALUE FOR MONEY	D

The INFERNO is a three-level adventure game in which the object is simply to get out alive! And, boy, it's Hell trying to do it! The all-text single screen game requires in excess of a minute to load; the disk is also interactively accessed for each room. The adventure abounds with random-generated Orcs, which have some bearing on the game in that they can cause you to start over; thus, the save-game feature should be often used, even at the cost of another minute required for restarting.

The puzzle solutions are a piece of Pillsbury on the first level; thus, the game initially is geared to neophyte adventurers as well as to more experienced players seeking a bit of diversion. The maze, which interconnects the initial levels, is very innovative and, while it cannot be readily mapped, there is a simple solution: a major clue, which is subtly buried in one of the room's descriptions, provides the answer for escaping from the first-level labyrinth.

Unfortunately, the game then becomes rather difficult, with more taxing puzzles, more monsters with whom you play "kill or be killed", including those noxious Orcs, who may prevent beginners from experiencing the entire game. Earlier versions of the game had several fatal errors which have since been corrected; should you somehow get an older version and it does bomb, you'll discover that obtaining a free replacement from The Software Emporium is no problem. A remaining problem, however, is that Integer Apples with 16K cards won't be able to run the disk due to the protection system not hooking into the card's Applesoft.

The vocabulary is frustratingly limited, but with departures from the common adventure syntax ("Drop" isn't synonomous with "Give"). On the other hand, multiple commands a la the Zork game promote the game's playability. While the game has several interesting moments, however, the constant necessity of restarting and the over-use of random functions for which there is no player-controlled alternative can rather quickly result in a loss of interest. Devoid of these drawbacks, INFERNO could be a really "hot" game.

LORDS OF KARMA

Company: Avalon Hill
Language: Assembly
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Tape

OVERALL RATING	C–	DIFFICULTY	C	ORIGINALITY	B
PUZZLE QUALITY	C	EASE OF USE	C	DOCUMENTATION	D
TEXT QUALITY	C	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	N/A	SAVE/RESTORE	D	VALUE FOR MONEY	C

LORDS OF KARMA is Avalon Hill's first sortie into Adventure games for the Apple. The object of the challenge is to gain Karma points by doing good deeds and killing off evil creatures that infest the game's environs. Get enough, pray a little, and you are immediately transported to Heaven (i.e., The End).

Undoubtedly, you'll get killed off numerous times during your initial attempts, each time ending up on top of a mountain without any of the possessions and weapons that you might have accumulated. There are five maze-like forests, a swamp, and several underground caverns to complement the rather small town area of Golconda.

The game has some problems. The all-text display which continually scrolls is rather blah and you must L(look) after each move to see what's going on. The "regrouping" of your randomly scattered possessions which occurs each time after you get killed tends to become tedious. The major problem is that the game is entirely cassette-based; while the 122 sector assembly language program can be easily saved to disk (A$800,L$77FF), it is somewhat laborious to go through the procedure of saving and restoring an in-process game (except back to tape). The tape load and game initialization time is quite long, which could prove a deterrent to playing the game more than once or twice.

Overall, KARMA doesn't live up to the expectations one gets from the flashy packaging. It has room for both visual and technical improvement; however, it still is a pretty good adventure game with a few interesting twists, one of which is: it is possible to win several games and still not uncover everything.

GOBLINS

Company: Highland Computer Services
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $27.50
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C	DIFFICULTY	B	ORIGINALITY	C
PUZZLE QUALITY	C+	EASE OF USE	B	DOCUMENTATION	C
TEXT QUALITY	C	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	C	VALUE FOR MONEY	C

GOBLINS is a monochromatic, Hi-Res adventure game featuring moderate puzzle content and considerable mapping. Mapping is mandatory and involves nearly 100 mostly-outdoor locations, with a multiplicity of interconnections; fortunately, there is only one maze of any consequence. The graphics are pleasant enough, but won't make one forget GOBLIN's competition. The object is to find all of the treasures, store them safely until all have been located, all the while surviving the random attacks of the Goblins, and doing so "before sundown".

GOBLIN's puzzles are neither particularly interactive nor stimulating; clues are either blatantly obvious or almost nil. Interest in the game is difficult to maintain after mapping is completed, largely because of the lengthy boot process and the ease of being killed off suddenly and unexpectedly, especially in the southern reaches of several quadrants. The program response speed is good, considering that the game is written in Applesoft; it is disk interactive only when moving between the four major areas.

The vocabulary contains just enough words to get the job done, but the game is not too demanding in that category. The text descriptions are adequate, if a bit on the thin side, and contain a paucity of humor or wit. GOBLINS will never be a classic, but it is a pleasant enough diversion, provided you haven't been spoiled by the more sophisticated games.

ZORK III

Company: Infocom, Inc.
Language: Assembly
Hardware Requirements: 32K Apple II/II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A+	DIFFICULTY	A–	ORIGINALITY	A
PUZZLE QUALITY	A	EASE OF USE	A	DOCUMENTATION	A
TEXT QUALITY	A	VOCABULARY	A+	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A+	VALUE FOR MONEY	A

Zork III completes the classic all-text adventure originally written in 1979 on the DEC PDP-11. Like its predecessors, there is a considerable amount of "new" material incorporated not present in the mainframe version, all written in the graphically imaginative style with which even the Apple's Hi-Res pages cannot compete.

When *Zork III* begins, you are at the bottom of a long staircase (which should strike a responsive chord to those who have completed *Zork II*), equipped only with your lamp and your imagination. At the end, you are in the Treasure Room with all of the treasures of Zork at your disposal, including a controlling interest in Frobozzco International. In between, you may hear, or see and hear, the fabled Dimwit Flathead, glimpse into a ritualistic scene from a to-be-hoped-for *Zork IV*, and speak with — or even command — the omniscient Dungeon Master himself. All along the way you will enjoy the excellent save-game implementation, command parser, and vocabulary characteristic of Infocom programs.

Zork III, with its 58 mappable locations (excluding the 8 by 8 matrix "Royal Puzzle"), is slightly smaller than its predecessors; but it is rich in subtle detail. It is perhaps the most entertaining of the three, with very logical, highly interactive puzzles. It is possible to successfully complete the game and still miss much of this detail: you may never find that peculiar set of conditions which can cause a sign to change in its inscription, hinting gently that you may have gone astray. There are numerous, amusingly tongue-in-cheek responses to inputs that otherwise get you nowhere. Overall, the game is somewhat more difficult than *Zork II*, due to several individually difficult puzzles, and also because of their high degree of interaction. You can easily find yourself in a no-win situation, a condition you may not realize until the game is replayed, making alternate life-and-death decisions which are available only once.

The conclusion provides an unexpected and novel twist, but to get that far requires an equally unusual approach as far as most adventures are concerned. Don't count on the seven point score system giving you any real guidance as to your true progress. It is relatively easy to have all seven points and yet find yourself in another no-win situation. The points, like other elements of the game, only prove that things are not always what they seem. Indeed, the toughest puzzles award no points, and several toughies remain unsolved even once all the points have been awarded.

Zork III represents a highwater mark for subtlety and logic, and is a Four Star must, not only for previous Zorkers but also for anyone who enjoys adventure games or pleasurable mental stimulation. The game is a separate and complete game unto itself, requiring no knowledge of *Zork I* and *Zork II*. However, for maximum enjoyment and imaginative continuity, it is recommended that they be played in sequence.

STARCROSS

Company: Infocom, Inc
Language: Assembly
Hardware Requirements: 32K Apple II/II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A	DIFFICULTY	B	ORIGINALITY	B
PUZZLE QUALITY	B	EASE OF USE	A	DOCUMENTATION	A
TEXT QUALITY	B	VOCABULARY	A+	HOLDS INTEREST?	A
GRAPHICS QUALITY	N/A	SAVE/RESTORE	A+	VALUE FOR MONEY	A

Starcross is a science fiction, all-text adventure game that continues to offer the quality and enjoyable features expected of Infocom, including the excellent save-game capability, command parsing, and vocabulary. It's long ago and far away, when suddenly the "strident alarm" of your one-man spaceship awakens you to advise you of the presence of an uncharted mass in space. Naturally curious (if you weren't it would be a very short game), you rendezvous, effect an entrance, map the 80 or so locations of the game, encounter both living and dead remnants of preceding alien civilizations, advanced technology, religious superstition, and past tragedy.

With a few exceptions, the puzzles are more of a singular nature than the interactive kind. While the game is somewhat less difficult than its predecessors in the series, there is a relatively difficult sequence which involves obtaining one of the twelve differently colored control rods. Thereafter, it becomes a matter of following through on the logic of the game, placing the rods in appropriately colored slots, and devining the real purpose of your presence there. Hopefully, you will be accorded the salutation of Galactic Overlord.

Unfortunately, the game ends at its high point, where suddenly everything comes together and all becomes clear. This final scene could well have been the basis of a game complete unto itself. Along the way to that scene are several clever side issues; for example, the Ray Gun may be fired at just about anything. Most responses are unique, and frequently have a humorous twist to them — even when you end up getting killed yourself. Throughout, the true use of the Ray Gun, which is required to successfully complete the game, is neatly disguised.

While the prose is a bit less vivid and expansive than in the *Zork* series, the plot and storyline are excellent, perhaps the best yet seen in any computer adventure. Like a good book, *Starcross* stimulates the imagination by not entirely explaining the situation as to all that must have happened in the generations during which the huge artifact has drifted. It is almost a shame to waste the story on kids, who will simply enjoy it for its puzzles, and who just might embarrass Dad with some questions about the Periodic Tables, Newton's Third Law, and Solar System basics. And in the event you get stumped you can go outside and play Flying Saucer Frisbee with the packaging.

COMPUTER BISMARCK

Company: Strategic Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $59.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	A	CHALLENGE	A	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	B

BISMARCK is a serious-minded war game, a detailed and complex simulation of the events of May 22 to 27, 1941 which culminated in the sinking of the German battleship Bismarck. The engagements started when the Bismarck and the heavy cruiser Prinz Eugen attempted to break out into the Atlantic. Historians have hotly debated what the effect would have been on the outcome of the entire war had the German fleet been successful in reaching the open Atlantic without detection. Were the German advantages of surprise and weather used most effectively in attempting the breakout by the particular route they chose? Or should the Germans have chosen one of the other two available routes? Would the British fleet ever have caught the Bismarck had it not been slowed by a single aircraft torpedo after a shell from the Bismarck sank the Battle Cruiser Hood? Many of these "what-ifs" or near-countless other options and alternatives are combined in APPLE-BISMARCK.

The intricacies of the simulation (for BISMARCK is no mere game) present one of the conflicts best features when two opposing "Admirals" are involved. However, the Apple II provides a rather worthy Admiral; Otto Von Apple, should you elect a solitaire encounter. In the single-player option, you may choose either an introductory Scenario which constrains Von Otto's imagination and affords you considerable intelligence information, or you may simply unleash Von Otto and let him take his best shot!

There is also a demonstration disk of the Introductory Scenario at many dealer's stores. A demo driver program is run that shows the prospective buyer a full sequence of displays and operations that will help significantly in understanding the documentation and rules. Don't let this short seven-and-a-half minute introduction mislead you; a two person game can last for hours, especially if the Bismarck breaks into the Atlantic where the lightly protected British convoys are no match for the German ship. (The program inquires once during each move if you wish to save the game or continue.)

The game is commenced by players alternately issuing tactical orders to each element under his command. The British Admiral has a force of 34 surface units and 14 airborne units at his disposal. The German forces consists of nine surface units. This seeming disparity in armaments means nothing; the German forces are formidable. They possess the major advantages in at-sea refueling and a surprise attack mode. Each unit has unique capabilities such as speed, firepower, armor and endurance, as well as different modes of operations involving station patrol movements which effectively alter the basic capabilities of that unit. These capabilities are further enhanced or degraded by changing weather conditions, time of day, and the total number of other friendly units occupying the same sector.

When both players have dispatched their forces, the computer moves all ships simultaneously, checking for possible interceptions by each opposing force. Options for shadowing enemy ships are offered and possibilities for submarine, aircraft and surface unit attacks are identified to the Admirals for strategy decisions. If combat takes place, a complex series of algorithms govern the probabilities of damage which affect a ship's subsequent firepower, speed and general capability.

APPLE-BISMARCK rivals chess in its intricacies and variations, with a healthly measure of probabilistic luck thrown in that may immediately alter your strategy. If you enjoy long periods of thoughtful planning and tracking interspersed with well-presented, rapid-fire text displays, then BISMARCK is for you. If you are short on patience or attention span and like your diversions simple, the cost of BISMARCK will buy you several games, each of which you will no doubt find more enjoyable.

PURSUIT OF THE GRAF SPEE

Company: Strategic Simulations
Language: Applesoft
Hardware Requirements: 48K Apple II

Department: Entertainment
Sugg. Retail: $59.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	**B–**	DIFFICULTY	**B**	ORIGINALITY	**C–**
PUZZLE QUALITY	**C**	EASE OF USE	**B+**	DOCUMENTATION	**D+**
TEXT QUALITY	**B–**	VOCABULARY	**B**	HOLDS INTEREST?	**C**
GRAPHICS QUALITY	**B–**	SAVE/RESTORE	**N/A**	VALUE FOR MONEY	**B–**

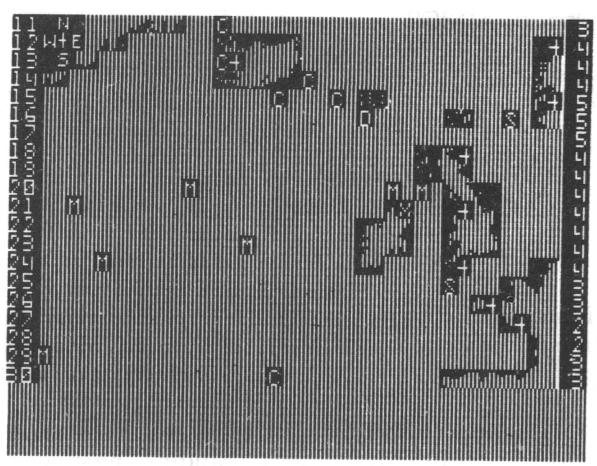
Pursuit of the Graf Spee is a World War II war game simulation. It offers four levels of difficulty, and you can start the game on one of two dates. The object of the game is to catch and sink the German "Pocket Battleship" *Graf Spee* by December 25th. It can be played by two people against each other, or by one player versus the computer. When playing the solitaire version of the game, you are in command of the British Navy attempting to corner and destroy the computer-controlled *Graf Spee*. In the two-player mode, you have your choice of who commands the English and who the German forces.

Each player is equipped with a data card. Among other things, this card contains all the strategic information about the ships in your navy. This information includes the hull strengths of the various warships, deck armor, size and strength of any guns, and structural strength. Each ship has a maximum fuel capacity, and registers a current fuel amount. You have to watch this carefully, since it's rather embarrassing to run of out fuel in the middle of the Atlantic Ocean.

The game takes about two hours to play the solitaire version, and at least four hours to complete a two-player game. *Pursuit of the Graf Spee* is marked as an intermediate level game; but once it is learned, a beginner will have just as much fun as the more advanced player. To be able to carry out a good campaign you will need to read the baffling instructions very carefully, then play the game once or twice to get a feel for it (notice how the ships move, and how the computer reacts to certain moves). As you improve, simply increase the difficulty and/or lessen the time period allowed in which to accomplish your mission.

If you think the odds are a little unfair (there are 12 British ships against 2 German ships), take a closer look. The British must catch the swifter German ships, and the strengths of the juggernauts offset the numbers. In a battle between three British ships and the *Graf Spee*, for example, the *Graf Spee* sank two of the three and crippled the third while the *Graf Spee* suffered only minimal damage.

On the whole, *Pursuit of the Graf Spee* does a creditable job of carrying on the Strategic Simulations' war game tradition. But the game's instructions leave a lot to be desired. They are unclear regarding some options, and assume in places that you already know how to play the game. The documentation is the weakest point of this package.



COMPUTER BISMARCK

COMPUTER AIR COMBAT

Company: Strategic Simulations
Language: Applesoft, Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $59.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	C+	ERROR HANDLING	B
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	A	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	D	VALUE FOR MONEY	B

COMPUTER AIR COMBAT is as detailed and highly modeled a tactical war game as are Strategic Simulation's earlier full scale offerings, COMPUTER BISMARK and AMBUSH. It is more complex than either COMPUTER NAPOLEONIC or CONFLICT, and is the most fascinating, challenging and frustrating of all!

The object is simple: intercept and shoot down any and all opposing aircraft. Three of the five different scenarios are intended as solitaire games; the other two-player games may also be played against Otto Computer, and in a near endless matchup between different numbers and types of aircraft. All aircraft are beautifully and completely modeled as to performance, armament and handling characteristics. Games may be saved, and the playing speed is faster than other full-scale war games; it is rather slow in the two-player scenarios, or if the global or position displays are frequently called.

The graphics are only fair at best. However, the major drawback is the total separation between the display/combat and moving phases. It is not possible to see (in proper perspective) or engage an opponent midway through a move phase. Only after the full move allowance has been "flown" can you attack. Unfortunately, by that time, you might have flown right by the enemy and if you don't get your attack going, the computer gets his! Also, the Hi-Res display is static during each player's move phase; you may well see your opponent on the screen, but in the relative position prior to entering and completing your move, and prior to his implementing his move.

The initial challenge is to learn to fly and maneuver your aircraft, which isn't as difficult and slow a process as might seem from first reading the instructions. A hand calculator is a near necessity to compute an intercept, and therein lies the real challenge. As there are neither animation nor 3-D effects, there is no true visual contact in those critical seconds prior to the final intercept. This can be especially frustrating in a head-on attack; if you mistime the end of the move phase, the target will be long gone by the time you half-loop and try to catch him in a tail chase (i.e., don't even try unless you have a significant speed margin).

The game will prove captivating to anyone with an interest in WW II aircraft, those with an interest in well-modeled war games, and to frustrated pilots. It has some irritating flaws; however, AIR COMBAT is a fresh idea with endless variety that will keep you coming back for more. Best of all, it's fun!

BATTLE CRUISER ACTION

Company: Mytopia Gameware Institute (MGI)
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	N/A	VALUE FOR MONEY	C

CRUISER BATTLE ACTION is an original war-game for the Apple based on the World War I Battle of Jutland, with an interesting historical section in the documentation. Five German ships, under computer control, and eight or nine British ships (depending on the level of difficulty) engage each other on a 20 x 40 text page grid, where each grid division represents 1000 yards.

A simplified but well-simulated war game, BATTLE CRUISER ACTION takes some getting used to; however, once command mastery is accomplished, it is unusually easy to handle. The movement phase is very slow, although the firing sequence responds fairly rapidly. The degree of realism is quite good, but the graphics and displays leave a bit to be desired. It is somewhat disconcerting that the top of the screen is on a heading of 270 degrees, rather than 360, and that it is possible to hit your own ships. Neither this feature nor its conditions are mentioned in the documentation, which also falls short in explaining the hit-probability table. The quality of the game would benefit by providing a final "scorecard" at the end of play before presenting its congratulations to the Admiral.

The enemy ships' maneuvering techniques are excellent, even at the low levels of difficulty. Each game is different and challenging, leaving one with a strong desire at game's end to go another round of play. If you emerge victorious at the lower levels of difficulty, be forewarned that at the higher levels, the German Admiral employs history-changing tactics.

TORPEDO FIRE

Company: Strategic Simulations
Language: Applesoft/Assembly
Hardware Requirements: 48K,

Department: Entertainment
Sugg. Retail: $59.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	A	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C

TORPEDO FIRE's fascinating concept pits WWII submarine(s) against an escorted surface convoy. The object is obvious; the game is long, often slow and tedious, but it is interspersed with high-tension excitement. Unfortunately, its implementation falls short of the mark, and it is by no means the game for beginning war-gamers.

The contest does have its problems. The Target Data Computer (TDC) is totally inadequate, needing to be told its own position, course and speed each time its called — it will not accept relative bearings or bow angles, only true bearings. The periscope, a really neat innovation, should be but isn't coupled to the TDC in any way. Neither is a hand-held calculator the answer, unless one reads the fine print about the torpedo course being set at 150 degrees from the center of the sub (One sub got wiped out when I had the Escort dead to rights, but I had to use "normal" trig to compute the angle to destroy the sub. Another sub was hit hard following an impossible-to-miss down-the throat shot at 300 yards — the high probability goes to near zero on such shots; however, even a four-torpedo spread with one degree dispersions missed!).

Minor problems include: not seeing one of the surface ships on the first turn; the nine-turn torpedo reload time seems an eternity; the graphic ship representations are very poor, especially considering the inherent capabilities of Budge's 3-D Package; a large red "T" used to represent a torpedo's position can only be described as coarse considering the Apple's graphic capabilities; golden opportunities are missed for the effective use of sound (i.e., sonar pinging, explosions, gunfire); the map is unwieldy in accessing and should be annotated for specifying which of its many scales are in use; the hard-to-use documentation suffers from a lack of screen examples and descriptions; the use of a speckled sea-water green color as the background for the system cards makes the black ink nearly invisible!

The excellent menu format of "Operation Apocalypse" would significantly speed and simplify the awkward system command sequence requirements and entries. On the other hand, the Move Preview is a major improvement and is interesting to behold. Also, each ship's Status Display is very complete and well done, while, fortunately, the "one to five minute" computer evaluation phase is only typically on the order of two minutes. The game goes quickly if there is sustained action, but it's a real drag while jockeying for position. Also on the positive side, the Ship Yards, although not too well error-trapped, are great for building ships to either predefined characteristics or to your own specs. Beyond that, a Beginner's Scenario is provided. In all cases, your opponent many be either the computer or a person, but in the Solitaire Game, the computer always has the sub side.

Overall, the games' fascinating concept is seriously marred by a multitude of shortcomings; a streamlined and "cleaned-up" version with better graphics would be a better value even at a higher price. Until then, an underwater version of "Air Combat" it isn't, but the well-modeled characteristics and mathematical calculations that are required should appeal to advanced war-game fans.

BATTLESHIP COMMANDER

Company: Quality Software
Language: Applesoft Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B–	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	B–	VALUE FOR MONEY	B–

BATTLESHIP COMMANDER is a computerized version of the age old game of Battleship. The object of the game is to find and sink the computer's ships before the computer discovers and destroys your ships. Each round consists of two turns; first yours and then the computer's. When it's your turn to fire, your shots are displayed on a 10 by 10 'target' grid. One of the nicer features of this display is the fact that your previous shots are designated by letters according to the round in which they were fired: 'A' for first round shots, 'B' for second round shots, etc. Also, the shots you fired in the most recent round are displayed in inverse. After you've completed your turn, the display is directed to your 'ocean' grid, (i.e., the part of the ocean where your ships are). The computer then fires its salvos at you. At the end of each round, the hits are tallied and displayed. Whenever a ship is sunk, its descent is shown in Lo-Res graphics complete with sound effects. At the end of the game, the winner is proclaimed and some computed battle statistics are displayed. All in all, a nice program.

SOUTHERN COMMAND

Company: Strategic Simulations Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

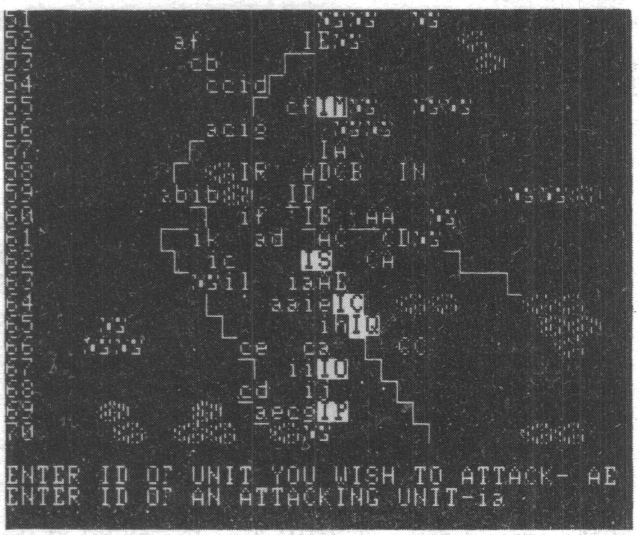
OVERALL RATING	C–	DIFFICULTY	B–	ORIGINALITY	C
PUZZLE QUALITY	C	EASE OF USE	C–	DOCUMENTATION	C
TEXT QUALITY	C–	VOCABULARY	B–	HOLDS INTEREST?	C
GRAPHICS QUALITY	B	SAVE/RESTORE	B	VALUE FOR MONEY	C

Southern Command is a battalion level simulation of the 1973 Israeli and Egyptian engagements at the Suez Canal. Two historical scenarios, differing only in the number of turns, and a free-form setup version are offered. All combinations are available for both solitaire and two-player games, with four degrees of difficulty for any scenario. The hex-grid system is unlike that of SSI's new *Tigers In The Snow*. Whereas *Tigers* has but two keyboard commands, other than the six numerical direction commands, *Southern Command* is a button-pusher's delight with over 30 commands, 3 command modes, and 5 movement/combat modes. Other bells and whistles include air-strike and directed artillery fire capabilities, hidden units (ambush time), and lots of scrolling.

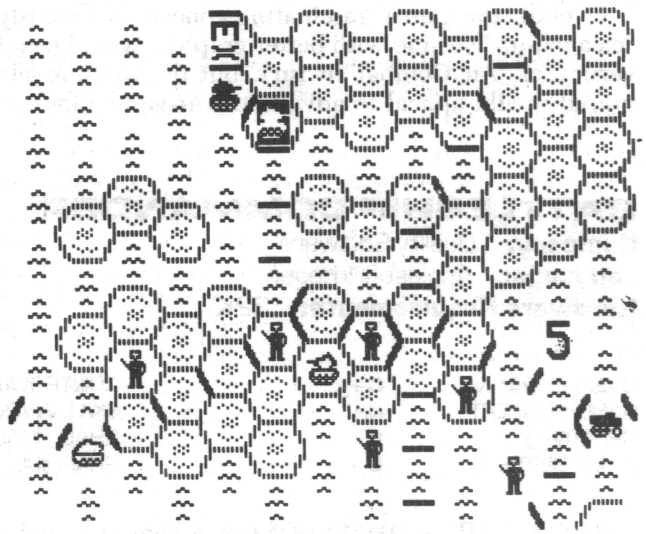
The plethora of commands makes SSI's typically hard-to-learn games almost impossible. The documentation helps by starting out with an example of the keystrokes of part of a typical move, but only up to a point. Beyond that, it's typical SSI detail without discussion. Trial and error, and using the command card, are the only ways to learn the control complexity.

Southern Command uses the same, excellent menu format not seen since *Operation Apocalypse*, to which it bears a stronger resemblance than to *Tiger In The Snow*. It is exceptionally fast, both in initial setup and in response speed. In fact, the screen reaction speed is so fast (especially during the computer's scrolling and play of the Egyptian forces) that it is impossible to follow or comprehend. For the same reason, the demo game, which runs like a rabbit for over an hour, does little to instruct and much to confuse.

The graphics are very complete and well done, with both a strategic and a twelve-screen tactical display available. The strategic display is useful only to provide a frame of reference regarding which section of the tactical map has been scrolled in. With the exception of the initial Israeli move, combat between adjacent forces cannot be avoided, taking place immediately after the initial move, and being signified by an audible buzz and generalized adjectives (heavy, medium, and light) to describe the relative forces of the opposing units. Thus, it is difficult, to say the least, to determine the relative losses and unit strengths. But then, difficult is the name of this game.



NAPOLEON'S CAMPAIGNS



SOUTHERN COMMAND

VC

Company: Microcomputer Games (Avalon Hill)
Language: Applesoft & Assembly
Hardware Requirements: 48K ROM Applesoft

Department: Entertainment
Sugg. Retail: $25.00
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	C	ERROR HANDLING	C
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST?	B
GAME DEPTH	D	GRAPHICS	C	VALUE FOR MONEY	C

VC is a Hi-Res war game of the same genre as Avalon Hill's previous war games. Hi-Res shape table graphics, some sound, and animation have been added; but it's still a random, number-happy game that is far from being a tactical simulation as it contends. However, as a war game, it does capture some of the frustrations of the war.

You are in command of ten Vietnamese Republic army units (ARVNs), a U.S. helicopter gunship, and a U.S. artillery unit. You find yourself in the middle of a 13 x 13 element map of Vietnamese straw hat shapes, initially representing neutral civilians, Viet Cong units, or North Vietnamese Army units. While there may be as few as four enemy units at the outset, political recruitment can swell those ranks rapidly. ARVN forces can make friends and allies among the civilians by moving through them; friendlies are marked by a blue straw hat shape with a small "F" dangling on it. A turn consists of being allowed to move one piece, and, optionally, firing your artillery.

The game ends abruptly, either when half of the civilian population has been killed (i.e., you lose), or when you have successfully dealt with all the baddies. Since games do go quickly, often in as few as ten moves, a save game feature is neither required nor provided. The speed of play is excellent, due in part to the original Applesoft program having been compiled on the otherwise unprotected disk with the TASC compiler by Microsoft.

Contrary to your initial reactions, *VC* can be beaten (even on the fourth and highest level of difficulty), but it takes strategy and a lot of luck. Watch the screen carefully after your initial move; the "hats" may change, and flashes may permit you to deduce where the *VC* are hidden among the civilians. While this permits use of your artillery, be sure that you guess right. Should you guess wrong, neutral civilians get shelled and you will lose most of your carefully cultivated allies, while promoting *VC* successes. *VC* will hold your interest, at least until you learn to beat it. Beyond that, however, there isn't much to it.

NAPOLEON'S CAMPAIGNS

Company: Strategic Simulations
Language: Applesoft and Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $59.95
Availability: 7
Disk or Tape: Disk*

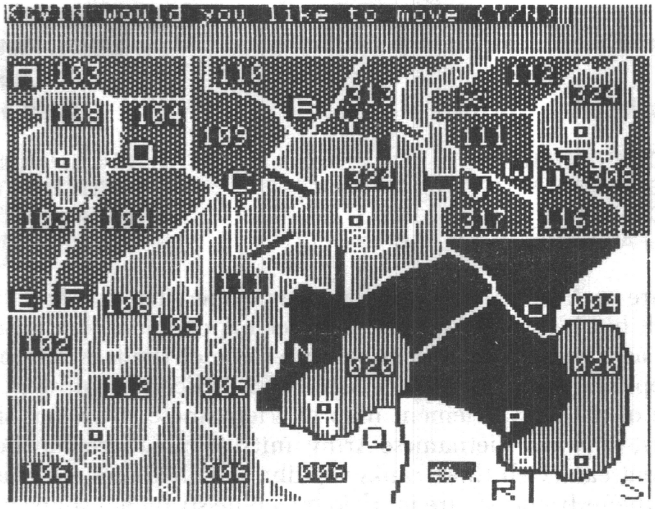
OVERALL RATING	C+	CONTROLABILITY	D+	ERROR HANDLING	A–
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	D
CREATIVITY	C+	CHALLENGE	B–	HOLDS INTEREST?	C+
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	B–

Napoleon's Campaigns: 1813 and 1815 is an historical, strategic simulation war game for one or two players. Each player is in command of a grand army, with units divided into corps. Communication between the corps is implemented through a dispatch system. Two scenarios are offered, Waterloo and Leipzig, each with its own Hi-Res map display, map board, and counter sets. The monitor display has a Zoom option which allows you to "zoom in" to a particular area for close up views. The screen graphics, while good, could use some improvement; but the graphics of the mapboard, counter, and rule booklet are very nice indeed. There are variable troop movement allowances, weather effects, and hidden movements to add to the realism of the conflict. Games in progress may be saved to a scratch disk for resumed play later, a welcome feature since it takes a number of hours to conduct a campaign.

Strategic Simulations claims that this game "set a new standard of historical realism" on the Apple. It does achieve this, primarily through the implementation of the dispatch system for issuing orders to your units. An unbroken "line of communications" must exist between the HQ command post and the particular unit in question to provide a good chance that your message will get through. Even then, there is no guarantee. It may take several turns before a dispatch reaches its destination, by which time the corps may have moved. Not only may messages be lost, there is the possibility as well that the corps commander will ignore the orders. This is an effective, accurate historical touch. Whether or not the orders are implemented enhances the realism of the contest, the "fog of war" atmosphere under which you play.

Book-keeping is a necessity, because you must keep track of previously issued dispatches. This, coupled with the rather lengthy computation time of the program itself, makes for long sessions of war. The Apple, incidentally, when pitted against the solo player, does not seem to experience the same communications difficulties and so plays an excellent game. In effect, it cheats, so be warned. You must be considerably more cunning to overcome its advantage in this regard.

The rules could stand to be re-written, since they are terse and unclear in spots. If you are the type who likes to get involved in the action, then this game may prove tedious: as in real life at the command post, there are considerable stretches where you feel more like a spectator that a participant. But, taken altogether, *Napoleon's Campaigns* is an involving implementation of a strategy game from an interesting period in the history of warfare.



DARK FOREST

SHATTERED ALLIANCE

Company: Strategic Simulations Inc.
Language: Applesoft, Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	C	SKILL INVOLVED	A	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	C	VALUE FOR MONEY	B

SHATTERED ALLIANCE is a tactical war game simulation pitting groups of mythical tribes with varying capabilities against similar opposing forces. Winning is less a matter of destroying opposing forces than it is breaking the opponent's unit and army morale through combinations of encounter results. In many regards, this game is similar to a scaled-down version of SII's "Operation Apocalypse". SHATTERED ALLIANCE is in a completely different setting, however, and uses a new move allowance concept, Time Points, as an alternative to incorporating any number of squares in a single move for different types of units.

This Time Point concept is both the strength and weakness of this game. Its strength lies in using this approach to speed-up the true game and, perhaps, making for a finer degree of modeling. Its weakness requires the player to react to a near real-time game, demanding faster reflexes, knowledge of the keyboard, and total concentration on the tactics and strategy being used. A greater weakness is that it leads to one-on-one combats, in which adjacent forces provide neither offensive nor defensive support. Time Points definitely take considerable getting used to, and according to SSI, will be the basis of a series of programs yet to come.

SHATTERED ALLIANCE features four scenarios for one or two players; well-done shape tables and text characters, using combat units which are difficult to relate to and differentiate between, especially on a B&W display; two map scales, both of which are adequate but very uninspiring; and a Demo game that is very difficult to follow, even after a thorough study of the documentation, as it seems to go on, and on, and on. The extensive documentation is light on game specifics beyond describing the screen displays and symbology, examples of combat situations, and information that would make the game more playable. It is heavy on mood-setting "background", as well as detailed descriptions of the various move and factor charts and rule Errata, both of which are included in the program and on a separate card.

There is a consistent emphasis on J.R.R. Tolkien-type characters, names and combat situations which Bilbo and Frodo fans will find both unsatisfactory and insulting. The game is difficult to learn to play with facility, perhaps more so than "Apocalypse", which is a better albeit more expensive game. Once learned, however, it perhaps is the fastest playing war game yet introduced.

DARK FOREST

Company: Sirius Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B

DARK FOREST is a Hi-Res game of strategy and conquest designed for one to six players. It is similar in concept to "Global War", but with several new twists. Each player's objective is to find his three hidden treasures by searching the six castles in the land chosen for that game (there are four lands to choose from). Searching a castle will also show the others if one of their treasures happens to be in that castle; naturally, you must have conquered that castle before you can search it. The castles are separated by territories which may also belong to others, and which will have to be overrun by your (hopefully) superior forces.

The similarity to "Global War" lies in the conquest of the territories and in being awarded an extra man for each territory that is under your control at the end of each turn; the difference is in DARK FOREST's far greater ease of play. The reason for this involves a simpler, uninspired map, but one which directly shows just who controls each territory and with what size army. Extensive use of prompts leads a person through each turn to further simplify the play. The strategies are not quite so simple, however; a wide variety is possible with the challenge involved directly proportional to the skill of the opposition.

In the single player game, the opposition is provided by computer-controlled Gruds, militant creatures who are also present in a multiplayer game, only to a lesser degree. The higher of the eight possible degrees of difficulty entail greater activity and involvement by the Gruds, who can be a very aggressive foe. A game scenario can be saved to the game disk following any full turn without the necessity of leaving the game.

DARK FOREST should appeal to a wide age group of players, and is fun for a single player as well. While a few random functions are around to spice up the game, the dominant theme is strategy and outthinking the opponents. All in all, this is a very enjoyable game without any major flaws.

OPERATION APOCALYPSE

Company: Strategic Simulations
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $69.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B

OPERATION APOCALYPSE is a full-length, significantly improved, and expanded "Rebel Force" (from Computer Conflict). SSI, producer of both games, briefly states the nature of the changes and modifications in a very low-key manner. To this reviewer, the elaborations make the difference between an interesting and intriguing simulation and a rather uninspired game. The game will definitely grow on you once you learn how to play it; however, it is not easy to master.

Four scenarios are provided, all using the familiar SSI hex-grid system. Either two-player or solitaire modes are provided in each scenario, selectable via a rather novel introductory menu. The objectives of each are well stated, as are the victory conditions. The games plays much more rapidly than previous SSI War Games. However, like other SSI games, it is highly disk-interactive to the extent of raising concern that the disk cannot be backed up by any of the current bit-copy programs.

The greatest difficulty with the game is the confusingly-written documentation. Real study is required, while actually trying a scenario is necessary in order to get the game really going; the five-turn automatic mode does little to clarify the many rule interactions and complexities. Be prepared to spend three to four hours trying to understand your first game, and another hour in re-reading the documentation. Frequent use of the "P" and "C" commands to stop the action during Mode Change and Combat phases is recommended to speed the understanding process. Each of the other scenarios will also require an additional hour or so to unravel so that intelligent moves and countermoves can be made. The game's excellent challenge, tactical opportunities, and fast-paced action can only be appreciated AFTER the required investment in time has been made.

TIGERS IN THE SNOW

Company: Strategic Simulations Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	D	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C

TIGERS IN THE SNOW is a Regimental to Divisional level war game simulation of the 1944 Battle of the Bulge. It offers two rather similar scenarios, differing in length and victory conditions; either or both sides may be played by the computer, and one or two players may compete. The familiar SSI hex grid system and Move Point concept are back, somewhat simplifying the learning process. The game features variable weather, supply and fuel conditions, which influence the Move Point allowance of each unit. Happily, there is no need for the opponent to ever "turn away" from the screen. It also involves artillery support, reinforcements, optional attacks on each unit by any or all adjacent forces, the probability of independent command actions overriding your orders, and a save game option.

TIGERS is one of the faster war games to come along and is only disk interactive between turns. The game speed is also a problem, in that the status displays flash by too rapidly for planning or understanding. The "hold action" commands of "Operation Apocalypse" are sorely missed. Indeed, there are only three keyboard commands other than the direction numbers, and Yes or No responses. TIGERS is not as tightly modeled as some of the SSI's other games, making extensive use of the randomizer which leads to a wide range of battle results for a given set of tactics.

As with many SSI games, the documentation is very confusing; be sure to read the "Apple Player's Aid Card" at least twice before even opening the documentaion! It is especially poor in defining the meaning and interactions of the various combat commitments that the player is called on to make. TIGERS has a variety of other aggravating flaws. One is not able to select the sequence in which the units are moved, check the status or location of units, control the air power when it is available. Symbols to name the historic and game significant towns, for example, could have been easily added.

Compared to "Operation Apocalypse", TIGERS IN THE SNOW is almost as difficult to learn, but is much faster in set up time and response. It is also easier and simpler to play. It is not as versatile or interest-holding as the more expensive "Apocalypse"; however, it is a superior war game to the equally priced "Computer Conflict". As a minimum, the simplicity of play permits war gamers to enjoy and concentrate on the tactical planning associated with this simulation.

MIDWAY CAMPAIGN/NUCLEAR BOMBER/PLANET MINERS/NUKEWAR/ CONVOY RAIDER

Company: Avalon Hill
Language: Applesoft
Hardware Requirements: 16K (32K if Disk or RAM Applesoft)

Department: Entertainment
Sugg. Retail: $14.95 each
Availability: 6
Disk or Tape: Tape

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	D
CREATIVITY	C	CHALLENGE	C–	HOLDS INTEREST	C
GAME DEPTH	D	GRAPHICS	D	VALUE FOR MONEY	C

The Avalon Hill Apple game programs bear little resemblance to their board games, even though several of the names are identical. The well-packaged programs imply involved and sophisticated war-game-like programs. Unfortunately, they are rewritten TRS-80 programs of relatively little complexity, making no use of any graphics, color, or text windows and only a monotonous (Control G) bell for "sound" effects. Neither are the text displays and "maps" anything to make you forget Apple-Trek. Several of them are fun to play, however, and will hold your interest for several replays. MIDWAY CAMPAIGN and NUCLEAR BOMBER are the best in these regards. All of them are easy to learn and entail (almost too) few system commands. In general, they are mediocre to good games dealing with death and destruction on a grand scale, as controlled by random number generators rather than well-designed algorithms.

MIDWAY CAMPAIGN: Very loosely based on the famous carrier battle of WWII. The computer will search out the opposing fleets. The aircraft quantities and probabilities of hitting the carriers with bombs are stacked in favor of the Japanese in this game. If you are not a war-gamer, Midway Campaign is a good challenge; you'll need luck to get them before they get you. (To win, try violating historic naval tactics by dividing your forces.) If you are a war-gamer, you'll be frustrated by the lack of tactical system commands and tire of the game very quickly.

NUCLEAR BOMBER: As the captain of a nuclear bomber on routine patrol, you are ordered to fly to within 250 kilometers of an identified Russian city and destroy it with your one Megaton weapon. Russian interceptors and missiles don't take too kindly to this idea and are launched against you from Defense Centers, which you can also destroy. The action starts very, very slowly, but picks up rather well. Not much fun for detente dilettantes, however.

NUKEWAR: As leader of a country you may name, you must decide where to stock up on arms, with what and whether or not to initiate a nuclear holocaust with a second country which you also name (I used my Mother-in-law's name). The opposing country may elect to initiate first strike hostilities — after that, it's a matter of a few quick turns, slugging it out, watching cities and bases get wiped out until the Hot Line rings to negotiate a peace. The winner is the country with the fewest million casualties. Little challenge, reasonable luck, but quick and fairly enjoyable. No extension option provided in the game for the effects of radiation poisoning.

CONVOY RAIDER: Very loosely based on the naval engagement and the sinking of the Bismarck, this game requires you to: command the Bismarck; seek, sink or evade four British battleships; locate and destroy the random convoys sailing toward Britain; and return to a friendly port (marked by an "*") — all this with essentially two commands!! Convoy Raider will tax your brain about as much as it does the Apple (on second thought, that may be an inappropriate analogy).

PLANET MINERS: The Solar System is open for exploration. Four "families" compete to gain the mining rights which may be granted after you orbit one of your five spacecraft about a planet. Claim-jumping, sabotage and protesting other's claims are all cricket. Of the ten system commands, six are for largely redundant information and status tables. The program is perfectly happy playing all four families; if you are still interested in playing after watching such a match, you can replace any or all families by human families. Several kids could easily pass some time, but as a solitaire game it rapidly becomes repetitively uninterestingly long before its forty move limit is reached. Would not exercise the mental faculties of a Fredric Pohl or Robert Heinlein (for you science-fictioneers).

COMPUTER CONFLICT

Company: Strategic Simulations
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C–
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

COMPUTER CONFLICT features two war games on a single disk: Rebel Force (a solitaire game) and Red Attack (a two-player game). Neither collectively nor individually do they match Strategic Simulation's other war games (as may also logically be inferred from the relative prices).

Both games are simplified versions of COMPUTER NAPOLEONIC, only in a hypothetical and contemporary setting. For example, both use the same general command summary, notations and type of playing field, but neither provide the same degree of involvement or player control (or length, for that matter).

Rebel Force requires you to march across a hexagonally-gridded playing field, occupy and hold a town for a period of time. Enemy forces, available in five relative difficulty scenarios, appear both when you move adjacent to them and during the computer movement phase. Combat is immediately initiated; while it may not be avoided, it may often be terminated by your retreating. The game plays more quickly and easily than other war games due to its relative simplicity. Unfortunately, the player usually has no control over (and little insight or understanding of) individual battle alignments or victory conditions for a given engagement. At higher difficulty levels, Rebel Force is rather difficult to beat, and to do so necessitates a reasonable degree of both strategic and tactical planning.

Red Attack's challenge is proportional to your human opponent's capability. While there is a more satisfying degree of player control available than in Rebel Force, the game is rather on the "thin" side. The object for the attacking (Soviet) player is to occupy two of the three towns on the mapboard by the end of the fifth turn. The object of the other player is to prevent such occupation. The game plays easily enough, except for the aggravating necessity of continually having to specify the hex coordinates that you wish to move to or attack; each player is, therefore, continually counting rows and columns.

All in all, COMPUTER CONFLICT is more of a beginner's war game; one which the kids would enjoy. Inveterate war gamers, however, would tend to lose interest rather soon.

COMPUTER NAPOLEONIC

Company: Strategic Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $59.95
Availability: Off-the-shelf
Disk or Tape: Disk (Protected)

OVERALL RATING	C	EASE OF USE	C –	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	A	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B	GRAPHICS	C	VALUE FOR MONEY	C

As Strategic Simulation's instruction manual states, COMPUTER NAPOLEONIC is intended to be a fast and simple introductory war game. This objective has been very well realized; therein lie both the advantages and disadvantages of this game. The game speed, both in command response time and in overall length, is faster than "Computer Bismarck" and much faster than "Computer Ambush". There are far fewer command options and complexities with which to contend. The trade-off is a coarser, more randomized simulation, lacking in the richer detail and accuracy of the more involved (and expensive) war game programs. Although it more closely simulates a board-type war game, this simulation lacks some of the sense of involvement and realism of a major martial conflict.

Two players, assuming the roles of Napoleon and the Duke of Wellington, command armies in a repeat of the decisive Battle of Waterloo. While the instruction manual provides an extensive and detailed history of the actual battle (which is more clearly written than some of the instructions), the replay *may* turn out drastically different. If you can't locate a human opponent, one player, as Napoleon, can play against the Apple's Duke, with a choice of two degrees of difficulty.

The Calvary, Infantry, and Artillery divisions, represented as letter pairs designating location, are easily moved by single-digit numbers, each of which corresponds to one of six possible direction movements. The movement allowances, division strengths, and influencing variables are much less involved than in the full-scale war games. A single battle's outcome is, therefore, more randomized than with computed (and time consuming) fine-grained probability determinations.

There is a single Hi-Res display of the game board. The text displays are well organized, and error trapping for incorrect inputs are good. The game's only debatable shortcoming is that there is no real end. Although the winner of each battle is flagged, the game just rolls unmerrily along.

War game enthusiasts will find COMPUTER NAPOLEONIC only moderately interesting, but novices will get an excellent introduction as to how these types of games differ from others (for example, the current entertainment-only series of current Avalon Hill "war games").

COMPUTER-AMBUSH

Company: Strategic Simulations, Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $59.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	D	EASE OF USE	F	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	A	HOLDS INTEREST	D
GAME DEPTH	A	GRAPHICS	A	VALUE FOR MONEY	F

COMPUTER AMBUSH is Strategic Simulations' second major war-game, following on the heels of "Apple Bismarck". In this simulation, two opposing infantry squads of up to 10 men encounter each other at a World War II French farm village. Both solitaire play (in which case the Apple commands the German players) and two-player games are supported. Three solitaire and three two-player scenarios are also provided. All except the "beginners' " NCO Training scenario (in which the four Americans start out being ambushed) prompt you to select the number and deployment of troops. For reasons to be discerned during play, Strategic Simulations recommends much less than the 10 man maximum capability.

The player issues a sequence of individual orders to each soldier who has different capabilities against a specified number of "time points" selected for each set of moves. Each order requires a given amount of time to carry out; thus, interaction between all men on both sides is possible. For example, covering fire for a zig-zagging buddy is

possible as he leapfrogs to the next building. One second of elapsed combat requires five time points; each set of turns may be allocated up to 99 time points, or almost 20 seconds, of highly interactive real time engagements.

Time points and their allocations are both the strengths and weaknesses of this game. The extensive number of Applesoft computations boggles the mind of the Apple user for a lengthy period of "Simulation Mode" thinking time. A mere five time points and combat orders to only four men (given the fastest mode of "unlimited" mutual visibility) require over 5.5 minutes of calculation time. Delays in excess of 30 minutes are possible with more involved orders, restricted visibility, or more infantry men. Unfortunately, these delays stultify the game for all except the most die-hard war gamers. For example, even assuming player interest can be maintained while sandwiching moves between reading your mail and dinner, it is nearly impossible to maintain a feeling of involvement and continuity of a tactical plan.

With the above exception and the distracting triviality of some required "orders" (e.g., reload your weapon, get up before running, fall prone before crawling), most of the mechanics are better than "Apple Bismarck". Status is simplified, back-arrow corrections are supported, use of sound is much better, and the documentation is "cleaner," logically organized and easier to use. As before, text formats, displays and graphics are very professionally done. But, oh, that delay!!

TACTICAL SPACE GAMES

SUPER STELLAR TREK

Company: Rainbow Computing
Language: Applesoft & Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B+	EASE OF USE	B–	ERROR HANDLING	A
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	A–
CREATIVITY	B–	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	A–	VALUE FOR MONEY	B

SUPER STELLAR TREK is an outstanding Hi-Res version of Star Trek. In this version, the Klingons and Romulans have teamed up to destroy the Federation. It is the job of their Starship Enterprise to rid the galaxy of enemies within an alloted time. Since this game is in real time, one has to be quick during battles. One no longer just takes turns against the enemy but has to shoot to kill or be shot at continuously.

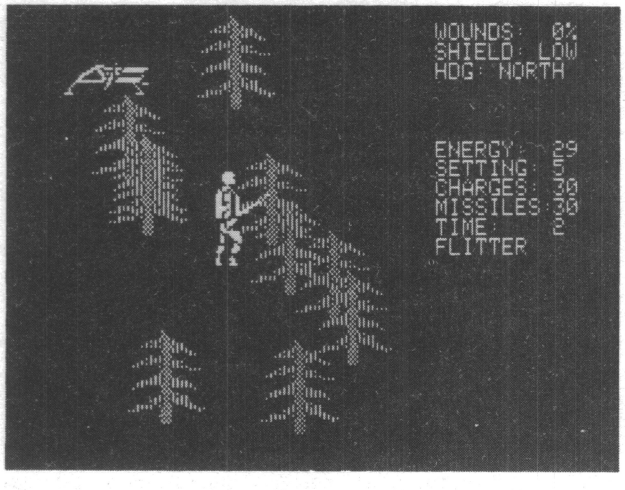
Your ship is complete with short and long range sensors, photon torpedos, death rays and phaser weapon systems, teleport units, shields, warp and impulse engines, shuttle craft, and, of course, an onboard computer. The game also uses black holes, supernovas, several starbases, and planets where one can mine dilithium crystals.

The tactical display is a masterpiece in engineering and programming design. The short range sensor screen shows all ships, planets, and stars in clear detail for any quadrant. All action, including movement and battle sequences, is animated on the screen. The display also shows the status of all ship systems. In addition, the strategic display (galaxy map) can be accessed by simply toggling the control key.

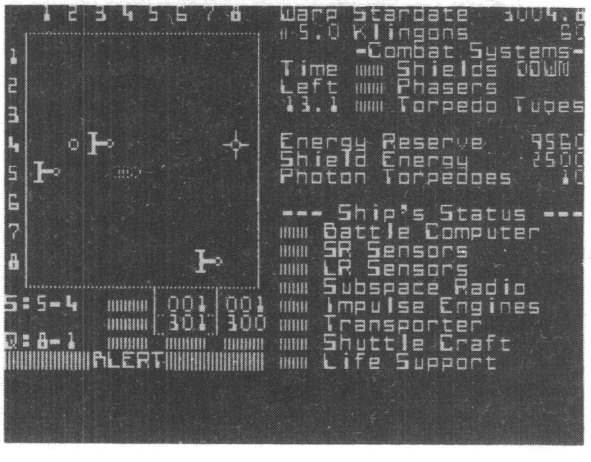
All commmands are entered by keyboard entry and are buffered so that the game will accept your command even while it is executing a battle or movement sequence. Some of the commands are complex and require practice in using correctly during the heat of battle, but, once learned, become almost second nature. The documentation fortunately includes a command summary sheet for reference.

The game has several levels of difficulty. The higher levels confront you with enemies (including a Klingon commander that can roam from sector to sector), fewer bases, and less time to win the game. Games are either randomly set up or they can be played in tournament style, in which all contestants play the identical game. There is also a "save game" feature for lengthy sessions.

SUPER STELLAR TREK is a definite improvement over Tom Burlow's original game. He converted many of his slow Applesoft routines into fast machine language. There is no longer interactive disk accessing which also caused his earlier version to be slow and annoying. The concept of the game is a classic and this version is the definitive Star Trek.



STAR WARRIOR



SUPER STELLAR TREK

STARQUEST/STAR WARRIOR

Company: Automated Simulations
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B+	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	A–	DOCUMENTATION	A
CREATIVITY	B+	CHALLENGE	A–	HOLDS INTEREST	B+
GAME DEPTH	B+	GRAPHICS	B+	VALUE FOR MONEY	B+

Compared to Automated Simulations' earlier programs, STAR WARRIOR is more like a Shoot-'em-Up, real-time game (especially at the higher difficulty levels), and seemingly faster paced. It is difficult to beat, while presenting even experienced players with a significant challenge during each new game.

As a futuristic and well-armed space warrior, you have your choice of two scenarios and three types of armored weaponry (plus a customizing capability). In one scenario, your mission is to create a diversion while your unseen compatriot attempts to clandestinely locate and assassinate the tyrannical Military Governor of the beleaguered planet Fornax. In the second scenario, you assume the assassin's role. In either case, you will have your hands full locating (or evading) nine different types of mobile, armed units, two forms of fixed weapons, and three types of fixed installations, including "Civilian" which is a no-no for your attacks. At your command are three potent forms of weapons, semi-invisibility and the ability to fly, jump and move through four types of terrain, all the while managing a limited energy supply.

The background and the game-specific documentation are excellent, as are the Hi-Res graphics. The commands are sufficiently varied and inclusive to fully control your "destiny," and make for a very challenging game, even at the lowest difficult level. While bearing strong resemblances to Rescue at Rigel and Dunjonquest, STAR WARRIOR is faster-paced and provides a greater degree of personal involvement.

GALACTIC ATTACK

Company: Sir-Tech
Language: Run Time Pascal
Hardware Requirements: 48K, DOS 3.3

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B–	ERROR HANDLING	B+
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	B–	CHALLENGE	A–	HOLDS INTEREST	B
GAME DEPTH	C+	GRAPHICS	B+	VALUE FOR MONEY	B

GALACTIC ATTACK is a one player, dynamic, real time simulation of a tactical space war game. With only the Earth and Luna being populated by humans, you must recapture the planets of the solar system from the Kzinti Invaders. As commander of the USS Blaise Pascal, you must travel to the planets, stave off enemy armies, and transport human armies to gain control. Kzinti Star Marauders patrolling the solar system are periodically trying to destroy you.

Since it is a real time game, any indecision in issuing commands can be fatal. The program is constantly updating the battle sequences even while waiting for your next command. Although it takes some practice, one must be able to control and direct the phasers and photo torpedos weapons while simultaneously maneuvering and repairing the ship. It is quite unnerving at first, in the midst of a three ship attack and a screen full of enemy torpedos, to quickly issue a weapon command with its sighting angle. The game does have an abbreviated command syntax for quickly aiming weapons.

The computer opponent is quite good. It is able to evade your attacks and retreat, allowing regrouping for mass attacks. Their computer-controlled aim is deadly. The game does have several adjustments for the level of game difficulty. For instance, one can vary the number of Kzinti Ships occupying the solar system or the amount of damage that it takes to destroy their ships. One can also play a short game in which the solar system extends only as far as Mars.

The graphics are very good. The information for the ship's status and scanners are displayed in Hi-Res. The game is well thought out; winning requires both strategy and tactics. The game is very easy to learn but tough in trying to survive.

SHADOWHAWK ONE

Company: Horizon Simulations
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $49.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	B–	ERROR HANDLING	A–
GAME CONCEPT	B+	SKILL INVOLVED	C	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	C+	HOLDS INTEREST	D
GAME DEPTH	C	GRAPHICS	C+	VALUE FOR MONEY	D+

SHADOWHAWK ONE is a game of space piracy set in the far reaches of a distant galaxy, where the Galactic Empire has just conquered the Noble Free Space Confederation. Using a remote outpost on a small, barren moon, your warship Shadowhawk One preys on the enemy's merchant fleet in an attempt to capture raw materials. This material can be bartered for better weaponry, more shielding, and a full armory of torpedos to be used in battle against the Empire's war fleet, who are intent on hunting you down.

Your section of the universe, which is displayed on a map, is divided into sectors. Beacons on the edges of the galaxy, plus others that you place elsewhere, inform your crew of the presence of spaceships. One must hyperwarp there to see if they are lightly-armed merchant ships or part of the enemy fleet of interceptors, corvettes, destroyers or cruisers.

The space battle sequences, using joystick controls, consist of three-dimensional battles. The enemy ships are nicely animated with Bill Budge's 3-D graphics package. Realistic fighting sequences will require quick reflexes to win. Your ship is armed with six torpedos and much weaker disrupters. If an enemy vessel is more powerful than your ship, the best tactic is to retreat then wait for the day when your ship is better armed. Merchant ships, on the other hand, are easy prey, since they will usually stop after their shields are damaged. Once their cargo is transferred, you can return to your home base.

The second portion of the game is the planet phase. You can trade your cargo for more beacons to monitor enemy shipping, strengthen your shields, hull, or weapon systems, or repair your ship. You'll need a very strong ship to defeat the enemy.

The game's major drawback is that the planet phase and your battle phase are two separate programs. When you travel from your base to another sector or from sector to sector, the game swaps several program files. It takes considerable time just to drop three beacons in three different sectors. Beginners will find the battle sequences very difficult. Since they won't realize that the attacker is a heavily-armed cruiser until its too late, they will be destroyed in a matter of seconds. There is no way to start a new game, except by rebooting.

On the plus side, the game concept, coupled with three-dimensional combat in which the enemy bobs and weaves in three-axis rotation, is very good. It is hard to tell how realistic the combat is, for, like most beginners, this reviewer gets shot down too quickly.

The graphics quality uses a very good 3-D design concept, while the rest of the game is mostly either text display or a map. Overall, the battles are fun, but the game's progress, because of innumerable program loads, can cause this contest to become tedious fairly quickly.

GALACTIC WARS

Company: Apple
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $35.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	C–	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	D+	CHALLENGE	C+	HOLDS INTEREST	D+
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

GALACTIC WARS is a space game that combines strategic play with real-time arcade battles. It is a two player game in which two opposing commanders attempt to expand their space empires. The object is to capture your opponent's capital star system. The galaxy is an 8 by 4 grid consisting of sectors. One stategically assigns baseships and fighters in ever-expanding territories. Eventually, the two opponents challenge each other within the same sector. The scene then shifts to a Hi-Res, star-studded battlefield where the two rival fighter crafts battle each other with lasers. Winning the game is based on one's shooting skill and maintaining the greatest number of fighter crafts garrisoned in that sector or destroying the opponent's fighters. The game is a fair space shoot-'em-up type.

THE WARP FACTOR

Company: Strategic Simulations Inc.
Language: Applesoft and Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C–	CONTROLABILITY	B	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	C

Strategic Simulations has applied its tactical war gaming techniques to a Trek-like encounter in outer space. Your mission is to inflict maximum damage to the enemy; hopefully, without being destroyed yourself. The game has the same familiar feel, strengths and weaknesses of SSI's earlier programs, especially in regard to slow playing speeds.

The dominant element of the game is the management of a tight energy budget, intentionally made rather restrictive. The rules and requirements for this task are extensive, but in order to become a proficient player, they must be learned by experience. Beyond that, a movement phase, including three sets of combat commands, and an interminably long computer movement/combat resolution phase carries you through to the start of the next move. After checking your status, looking at a so-so Hi-Res situation map, it's back to allocating your energy again.

Four solitaire and one two-player scenarios are available, with the player having his choice of 12 types of ships, each with its particular armament, protection, and (to a degree) performance characteristics. The above similarity with the more highly-modeled war games, such as Air Combat and Bismark, ends rather abruptly. The game is a rather long, two-dimensional, outer space "attack" game, but without a save-game option which would have been helpful for avoiding a rather bored feeling that develops after several turns.

If you liked Computer Conflict, you will enjoy this game, but don't expect it to compare with the more highly modeled, and more expensive war games from SSI. Similarly, space freaks, interested in something a little different, will enjoy it; don't look for the whimsy of planets, black holes, stars and related galactic saga trappings. Rather, it's a moderately sophisticated, slow-moving, straightforward game that requires some thought and planning.

INVASION ORION

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	C+	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B–
GAME DEPTH	B–	GRAPHICS	C	VALUE FOR MONEY	B–

The Orion series of space games are complex tactical games requiring in depth strategy and skillful playing. INVASION ORION is the one player against the computer version where the computer plays the Klaatv enemy fleet. In each of the 12 game scenrios included (one can create more with a built in program) there is a set objective. For example, one might have to defeat several ships blocking a trade route and land on a planet or asteroid to win. The game can be as complex as 9 ships fighting on each side, fighting against other.

Each ship has an amount of energy per turn to be allotted to movement, shields, tractor beams, missiles and laser weapons. Damage to one's ship reduces the amount of energy available, and the distance to the enemy, displayed on a two dimensional display board, determines weapon effectiveness. Missiles are in short supply and are not replaced during the battle. Tractor beams are used to pull an enemy closer. Movement speed depends on energy available and ship mass. Sometimes one might find it necessary to move behind several blocking asteroids for defense.

After both forces have completed their moves, the computer resolves the battle. If the amount of energy in the enemy's weapon system exceeds the armament energy, damage is sustained. At zero energy, the ship is destroyed. The computer displays the results of the battle and the game continues.

Players who enjoy long complex space battle games would definitely enjoy this game. Although the graphics are nearly minimal, their lack doesn't diminish the quality of the game. Games depending on complexity can last from 15 minutes to hours.

STARSHIP COMMANDER

Company: Voyager Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk*

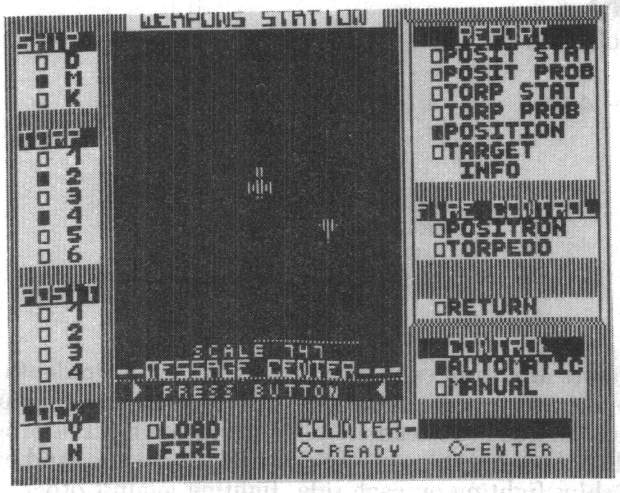
OVERALL RATING	**C+**	CONTROLABILITY	**A–**	ERROR HANDLING	**A**
GAME CONCEPT	**B–**	SKILL INVOLVED	**C**	DOCUMENTATION	**B**
CREATIVITY	**C**	CHALLENGE	**C**	VALUE FOR MONEY	**C**
GAME DEPTH	**B–**	GRAPHICS	**B**	HOLDS INTEREST?	**C**

Starship Commander puts the player in command of the USS Ranger in an extremely detailed space combat simulation. As commander, one must manage a crew, navigate, allocate power, maintain shields, and fire weapons at up to three enemy vessels. While lacking any real time urgency in giving orders during battle, the game adds a richness in detail not found in other games of its type.

The game can be played against one to three enemy ships. The computer can either choose the positions and types of enemy, or you can choose them to your liking. All enemy Vegan movements are tracked on a motion detector display. Once close contact is made, the commander has a choice of many options including bluffing them into running away. But the usual method is direct attack. This involves getting a fix on the enemy position, scanning their ships, and loading positrons or torpedoes and firing them. The actual battle is shown from your viewport in a perspective Hi-Res display.

The battle is never one-sided. Your ship often takes direct hits and sustains damage. Crew are killed and others have to be assigned damage repair. A map of the damaged ship is displayed to help in your decisions. Energy, especially in a damaged ship, must be allocated to life support, engines, shields, or weapons depending on what is needed at the moment.

All orders are input via the paddle. When a particular order needs to be given, the choice is made by turning the paddle. Only valid choices are indicated, and the selection is made by pressing the button. There is no need to remember obscure order codes which are typed in with other games. In this regard the game is a pleasure to play, but the slowness in switching between programs on the disk (there is one for each mode: combat, navigation, engineering, etc) makes a slow and tedious game. Yet if a war game player doesn't mind a slow game if the detail is good, then this tactical game, which requires at least an hour to play, will be worth the time. And if you lack the time to finish, there is a save game option.



STARSHIP COMMANDER

STELLAR ACTION

Company: Mytopia Gameware Institute (MGI)
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	C+	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	N/A	VALUE FOR MONEY	C

STELLAR ACTION is a No-Res text page space game highly reminiscent of the Stellar Trek game once provided by Apple on the DOS 3.2 Master Disk. In this version, which may be played solitaire against the computer or by two players, there is but a single 10 x 10 sector of space in which you and an enemy ship (two types) must fight it out to the bitter end.

Movement, energy management, a variety of weapons and a considerable amount of luck must be employed against the enemy ship. His ship will move before you can effectively fire; you cannot "lock" your weapon to track his movements. The task is to outguess him by firing into the area where you believe he will move while, at the same time, avoid his fire, which also attempts to anticipate your moves.

The accompanying "Space Manual" is quite detailed, but the game somehow doesn't fulfill initial expectations despite the considerable array of weaponry at your disposal, even with due allowance being made for the crowded display. If you feel intuitively lucky and are a devotee of "older" style space games for the Apple, you may be interested in a few STELLAR ACTION engagements before returning to Star Trek for your nostalgia trips.

GALACTIC GLADIATOR

Company: Strategic Simulations, Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $77.95
Availability: 7
Disk: Disk*

OVERALL RATING	C+	CONTROLABILITY	A	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	A
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST?	C+
GAME DEPTH	C+	GRAPHICS	C	VALUE FOR MONEY	B

Galactic Gladiator is a tactical shoot-'em-up game in which two teams of futuristic aliens battle each other using lasers, disruptors, and hand-held guided missiles. Each team first enters the commands for his gladiatiors: move, dodge, attack, change, or reload one of two weapons. In the action phase, the first shot goes to the fastest draw — perhaps nailing the key man in the opponent's attack, and temporarily or pemanently putting him out of action. Combat normally continues until a team is eliminated, or surrenders; although some options have a "capture the flag" variation.

The main strength of *GG*, as it likes to call itself, is its ease and speed of play. Well prompted, single keystrokes define actions for the gladiators, display the options available (which includes a save game feature, as some games can become lengthy), or show a readable set of current attributes. With two opposing players, or with one controlling both teams, the speed of play is pleasantly fast. In a solitary game, there is a noticeable decrease in speed. The computer can be a very formidable foe; the documentation provides some insight on the strengths and weaknesses of the computer's game, which an opponent may use to his advantage (i.e., to cheat!).

GG features several variations called in during the many-menued, start-up procedure. A player may choose from 6 game scenarios, to indoor or outdoor arenas of three different sizes (with or without grid marks), 15 species of gladiators, 11 types of weapons, and two degrees of armour. It is also possible to merge previously-saved teams. You can also change just about anything you wish, even to the point of creating your own game and monsters.

Either an in-process game, or the victorious team can be saved to a separate disk, initialized from the SSI disk. The otherwise good documentation is weak in describing how to use this feature, which takes a some getting used to, what with all the menues and options. The graphics also leave something to be desired; although exploding characters following a hit add a touch of satisfaction (or dismay). While some shape tables dot your screen, all the sizes and types of the play fields bear a marked similarity to a low resolution display. There is some animation, color, and sound — none being a strong point of *GG*.

Despite the many variations, *GG* wears thin after the first several games; there is a certain similarity to all the games, with insignificant variations. One last detail: don't be misled by the sexy (?), embattled female on the cover; that's the last you ever see of her!

GALACTIC EMPIRE

Company: Broderbund
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	B–
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	B–

GALACTIC EMPIRE is a well-done space strategy game for one player. It involves empire building, often by war, in a small galaxy of 20 planets. In a galaxy as gargantuan as 60 light years, it is a formidable task. One must plan well by first sending scout ships, then ordering enlistments and ship construction on technologically advanced planets, and finally sending them to planets for a rendezvous on an alien landscape where you will do battle at some time in the future. Because your planet is not the most powerful in the galaxy, you must pick your targets carefully while making sure you're not overmatched. Then you have to do battle until you are in a position of using three or four planets for building up your war machine.

The game display or computer console is attractively laid out. One can call up star maps, planetary directories and status reports. Officers each have their functions; one for handling scout ships, another for navigation, another for enlistments and ship construction, and finally a doctor in charge of cryonics. The display during battle is rather simplistic but functional. It continuously monitors battle losses in order to determine if one should retreat or make momentous offensive moves.

The error trapping is quite good. One can't simply fly off to a planet and attack without first enlisting an army on your home planet. If this tact were attempted, one would simply have to fly back, wasting valuable time. The instructions are clear and give strategy hints. This is the first of a series of games.

GALACTIC TRADER

Company: Broderbund
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C–	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	D
GAME DEPTH	C	GRAPHICS	B–	VALUE FOR MONEY	C

GALACTIC TRADER is the second in the Galactic Saga trilogy. It is a one person, space strategy game where one roams the universe's trade routes, wheeling and dealing with the aliens. The further the source of supply, the more valuable the cargo. But one must be careful not to play a lucrative route often as the cartel will cut in. One trades one planet's items for another, occasionally returning for refueling while trying to amass a fortune in credits.

The game has very similar graphics as Galactic Empire and documentation. It just isn't that interesting a game. Of the three games in the trilogy, this is the weakest.

GALACTIC REVOLUTION

Company: Broderbund
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B	HOLDS INTEREST	B–
GAME DEPTH	B	GRAPHICS	B–	VALUE FOR MONEY	B–

GALACTIC REVOLUTION is the third of the Galactic Saga series. It is a one to three player game. Since there are three roles in the game, the computer will play the emperor in games of one or two players. The object is to cause a revolution on each of the planets belonging to the empirical league in order to gain control and defeat the empire. It can be a contest of alliances in a multi-player game or a solo game of conquest; however, a battle loss would convince your conquered and allied planets to revolt. Diplomacy and influence are the keywords to this game. One can influence a planet to side with you if one can manipulate the different power groups on the planet by administrative edicts. Example: The Traders' influence would increase if they were made wealthy by lowered tariffs. The peasants' influence would decrease if drafted. Each edict has subtle influences throughout the galaxy. One also raises taxes, builds armies and ships with each turn.

The game has been well thought-out with its checks and balances. It might become a very drawn out game if one player becomes insistent on making slow choices and calculations during his turn. The documentation (booklet format in this game) is quite complete. The avid space strategy fan will enjoy this game.

TAWALA'S LAST REDOUBT

Company: Broderbund
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C+	EASE OF USE	B–	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C–
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	C

TAWALA'S LAST REDOUBT is the fourth and final program in the Galactic Saga series. In it, Benthi, a woman rebel leader, leads her small band of warriors on the planet Farside against Emperor Tawala's forces. This is a difficult task on a planet whose towns are ruled by tribal chiefs who are just as likely to help as not. The player can send spies out to various crossroad towns to intercept coded messages and monitor enemy troop movements. Messengers are able to act as emissaries to neighboring towns in order to ask for help or purchase arms. Troops can be moved to attack and garrision unloyal Farside towns.

This is a speeded-up real time game. The inability to muster adequate supplies and men in time will result in your army's demise. The game is strategy-oriented with many random events and requires keeping track of things on a Hi-Res map. Other than the map and several pictures, the use of graphics is minimal. The only animation is the messengers running off to the next town. Battle results are reported and in the final attack against the Redoubt, only the size and position of the two field armies are shown.

The game has some merit as a strategic game and uses some clever techniques. However, it isn't very exciting; considering that it has been anticipated with such relish, it is somewhat disappointing.

BOARD GAMES

L.A. LAND MONOPOLY

Company: Continental Software
Language: Applesoft
Hardware Requirements: 48K

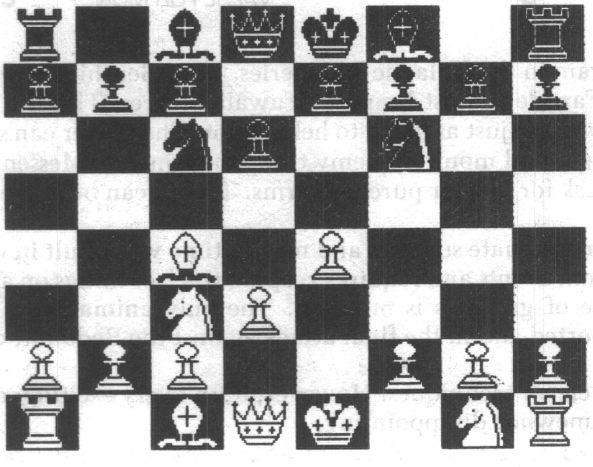
Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

L.A. LAND MONOPOLY is a special Hi-Res adaptation of the familiar game made especially for the Apple computer. Two to six players either create a monopoly game of their choice or play the L.A. version which has local street names, freeways instead of railroads, and chance cards that reflect local folklore.

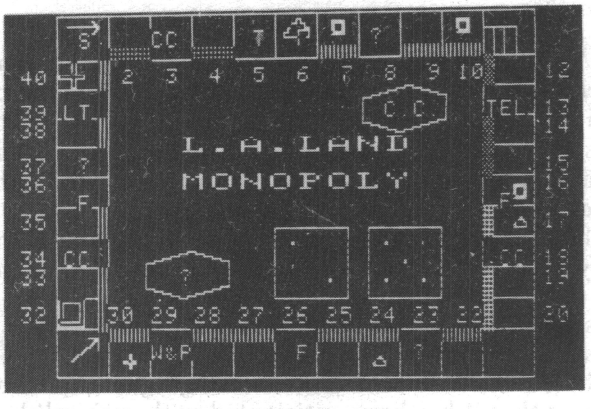
The create your own game module allows the players to invent their own game for any city or town where they live, whether it be San Francisco, Kalamazoo or Atlantic City. Two different game modules can be saved to the disk for later play.

The game is played on an animated Hi-Res color display board. The dice are rolled on screen, then each player's token automatically advances around the board. As in the real game one may buy, sell or mortgage properties and houses. The computer acts as banker and keeps track of money, property ownership and rental charges. All standard rules apply although the players may choose variations at the start. In addition, a game can be saved at any time for later play.

The computer has excellent error checking routines for catching illegal transactions. The documentation is thorough and clearly explains all rules. It also includes charts showing return on investment for various properties. Highly recommended.



SARGON II



L.A. LAND MONOPOLY

APPLEOPOLY

Company: Computer Consulting
Language: Run-Time Pascal
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	D+	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	D+	DOCUMENTATION	F
CREATIVITY	C–	CHALLENGE	C–	HOLDS INTEREST	C–
GAME DEPTH	B	GRAPHICS	C–	VALUE FOR MONEY	D

APPLEOPOLY is based loosely on the popular board game, "Monopoly". The game has a Hi-Res board that physically resembles the Monopoly board; however, no property names are assigned, and the railroad locations are designated as restaurants. Although there are many similarities in the dynamics of the game, Monopoly fans may look askance at this version.

The fun in obtaining different kinds of luck cards is missing. Instead, one has a lucky choice, which has already been predetermined by the computer. You can win $152 or lose $52 by choosing A or B. This, coupled with only a $100 bonus for passing start, changes the entire monetary relationship of the game. Instead of a $500 reward for Free Parking, there is a similar reward for rolling snake eyes. If you run out of money, the computer mortgages your property at the game's discretion. You can buy the encumbered property back only if you land on it again.

The game has numerous other differences. You can only buy one house per turn, and you don't have to evenly distribute your newly-purchased buildings on your property. A hotel on one property in a monopoly group without any other houses on the other properties is legal. Rolling doubles can't be used for getting out of jail, and trading properties between players isn't allowed.

APPLEOPOLY appears to be a look-alike game, somewhat similar to Monopoly, but with enough differences to be a disappointment. If you are looking for the real game, there are other choices. "Monty Plays Monopoly" is fun to play against the computer; a Lo-Res version requiring your own board. The computer only acts as the banker and assumes that you will make valid moves on the main game board. Another choice is "L.A. Land Monopoly". It is a tournament Monopoly game with Los Angeles street names, but contains a program that allows you to enter your own street names including the standard game's names. This Hi-Res version, which is designed for up to six players, has extensive error checking, offers every game option, and is cheat-proof. It also has a save-game option for long games.

SARGON II

Company: Hayden
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	A	EASE OF USE	A–	ERROR HANDLING	A
GAME CONCEPT	A	SKILL INVOLVED	A	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	B+
GAME DEPTH	B+	GRAPHICS	A–	VALUE FOR MONEY	A

SARGON II is one of the best and most powerful chess programs available for the Apple or any other microcomputer. This game and its earlier version have won most of the microcomputer chess tournaments since 1978. Only recently has a Z-80, CPM-based challenger beaten it. (See "Mychess" review.)

SARGON II offers six levels of play, an excellent Hi-Res board display, the ability to set up chess problems, and a kibbitz mode for players who need a suggestion for a best move. The computer's response time is not exceptionally fast on the higher levels of play. While the first level of play takes only 20 seconds, very advanced levels take an hour or more. However, most advanced players would be humiliated at levels with a response time of from two to six minutes.

The program is very easy to use. Initially, the text page and the board can be toggled by the ESC key, even in the middle of a move. Chess notation is not standard; however, it is perhaps simpler for beginners. The board is lettered horizontally (A-G) and vertically (1-8). Moving the king's pawn two spaces is accomplished by entering E2-E4. Although no hard-copy of your moves is made available, the last 20 moves are always displayed on the text page.

SARGON II is a very worthy opponent for any chess enthusiast. It is currently rated at 1400 life points. Because of its style and ease of use, it has to be rated as the finest chess program to date for anyone with a standard Apple.

MAH JONG

Company: Tabuko Original Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: 8000 yen(est.)
Availability: 1
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	A
GAME CONCEPT	A	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	N/A	CHALLENGE	C+	VALUE FOR MONEY	B
GAME DEPTH	N/A	GRAPHICS	A–	HOLDS INTEREST?	B

Mah Jong is a four-handed game of Chinese origin, played with tiles. In many ways it resembles the card game of Gin Rummy, but has the subtlety of poker. In the Orient, where it is extremely popular, it is a gambling game.

This version, a Japanese machine language implementation, differs greatly from the Americanized version that women sometimes play. Perhaps the major difference is the lack of extensions, particularly flowers, that Americans use as scoring bonuses and wild cards. The other difference is the number and type of valid hands.

The *Mah Jong* set, in this version, consists of 112 tiles. Each of the four players draws 13 tiles, and by successive draws and discards attempts to form his hand into sets of suit tiles and honors. The emphasis is on "going out" quickly. The liberal definition of a complete hand gives considerable scope for skill, and the first to lay down a complete hand wins.

The tiles are represented by symbols. There are tiles for East, West, North, South, Dragon, Ban, Mon, Fa, Ton, and Giun. The value of each tile is represented by Kanji or Chinese numerals. Play begins with each player drawing and discarding a tile. Play can be stopped at any opponent's turn with a press on the space bar. Thus one can pick up a discarded tile to make groups of three or four. The drawn tile is displayed in a slightly offset position. Discarding is by letter key press and a space bar. The tiles are automatically arranged for you by suit. To "Mah," or win, you must have a valid hand. These hands, as in poker, consist of certain combinations, similiar to, say, having a full house in draw poker.

This is a very slick Hi-Res implementation of the Chinese game. The documentation is, of course, in Japanese. The program is easy to use if you can read the instructions, and it has excellent error trapping. The computer, as an opponent, is slightly above average. Players who use this version will detect perdictable play patterns. Like most games of this type, it is more exciting to play against three people.

GAMMON GAMBLER

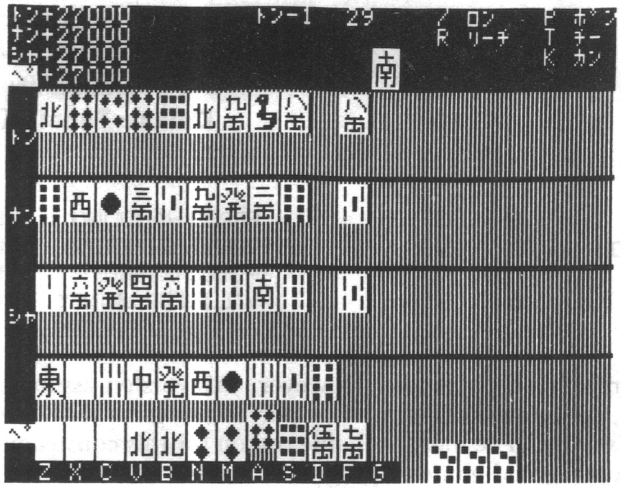
Company: Personal Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Disk*

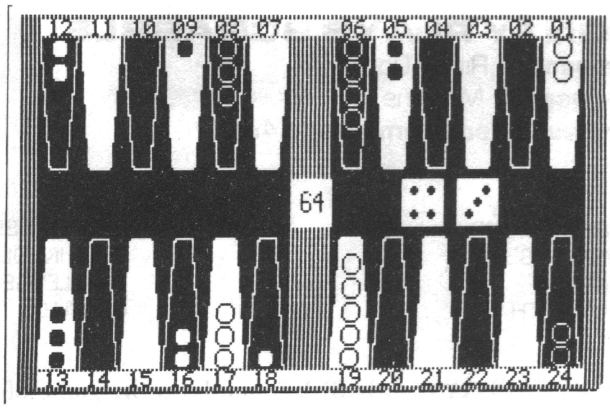
OVERALL RATING	B+	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	C+	GRAPHICS	B	VALUE FOR MONEY	B

Gammon Gambler is an outstanding backgammon game for either the beginner or advanced player. There are 10 levels of play from which to choose. Players' moves are quite simple. Enter the position that you want to move from, and the computer will automatically move the pieces corresponding to what is displayed on each of your dice. If one wants to move using the roll of his second die first, simply reverse the dice with the "X" key. Moves can be taken back before you relinquish your turn to the computer. The game also makes use of the doubling cube.

The screen layout of the board is nicely done in Hi-Res. The position numbers are shown along the edge of the board. The documentation is clear and concise. This is definitely the most challenging of the backgammon games.



MAH JONG



GAMMON GAMBLER

FAST GAMMON

Company: Quality Software
Language: Assembly
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**B**	EASE OF USE	**C+**	ERROR HANDLING	**A–**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**B**
CREATIVITY	**C**	CHALLENGE	**B**	HOLDS INTEREST	**B**
GAME DEPTH	**C+**	GRAPHICS	**B–**	VALUE FOR MONEY	**B**

From Quality Software Co. comes a "Quality" Backgammon Game. The Hi-Res Graphics are very good—response time and error checking are also superior. Quality Software makes no claims that *Fast Gammon* plays an expert's game, and it doesn't. Overall, it is an excellent learning program for beginners to average players, and will provide challenge and practice for better players. Although it has a strong midgame, it has a weakness in its end game. Its major strength is its speed of play. One nice built-in practice feature is the ability to replay a game with the computer repeating its previous moves.

MICROGAMMON II

Company: Softape
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**B–**	EASE OF USE	**A**	ERROR HANDLING	**B+**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**B**
CREATIVITY	**C**	CHALLENGE	**B–**	HOLDS INTEREST	**B**
GAME DEPTH	**C+**	GRAPHICS	**B**	VALUE FOR MONEY	**B–**

MICROGAMMON II is an improved version of Softape's original Backgammon game. Both the user interface and the graphics have been greatly improved. Playing ability compares favorably to "Fastgammon", with Microgammon's design approach involving use of the doubling cube.

Perhaps its best feature is its ease of use. Keying the space bar shifts a diamond cursor over your legal moves only. Entering the value of the die from the keyboard actually causes the piece to shift. However, the cursor always appears on the piece just moved so that one may have to shift it almost completely around the board in order to move a second piece.

Moves can also be taken back if you change your mind before your turn is over.

MONTY PLAYS SCRABBLE

Company: Ritam Corp.
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	C+	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	B

MONTY PLAYS SCRABBLE simulates the game of Scrabble on the Apple. However, this version assumes that you own a Scrabble board game in order to play. Actually, the game could almost be played using the Hi-Res board display, except that it is only shown while one positions his word. The most probable reason for this constraint is to make sure Scrabble's manufacturer sells a copy of their copyrighted game to program owners.

The program handles the game with a rather novel mixture of Lo-Res and Hi-Res displays. One or several players compete directly against "Monty". One has the option of letting the program pull random tiles for you, or one can input the board's real tiles for play. With the former option, players take turns seeing their Lo-Res tiles displayed on screen. Formed words are positioned on the Hi-Res screen by keyboard control. Any player can challenge a word, even "Monty's".

"Monty", who can play on one of four levels, is a formidable challenger, especially on the upper levels. The game has a disk based vocabulary of 54,000 words. It takes two minutes to form and check a word on the advanced level. The scholarly level takes over three minutes. Its choice of words like "moiety" had me rushing to a dictionary. Although, in general, most words were dictionary-correct, the words that are formed in the other direction often were illegal. Words like "ef, bo and ar" are blatantly incorrect. On several occasions, even the formed words, "tav," and "rax" were not in my dictionary; however, they possibly exist in the official Scrabble dictionary. I wouldn't really knock its playing ability, since to err is human; besides, these words can be disqualified.

Most games require very little input other than entering one's word. There is a menu for exchanging tiles, passing, saving the game, checking your tiles, reentering a word, or changing the skill level. The one thing that cannot be done is re-examine the board; thus, the necessity of using an actual scrabble game board. Additionally, bonus squares don't show on the screen's board.

The manual does not explain the rules of scrabble; rather, it describes the program's capabilities by using a question and answer session. It does explain some of the options, such as "Monty" playing against itself in a demo mode or switching tiles with "Monty". Overall, the program acts as a good substitute for another player in a game of Scrabble and is useful for honing one's verbal skills.

MONTY PLAYS MONOPOLY

Company: Ritam Corp.
Language: Applesoft ROM or RAM
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	D	EASE OF USE	D	ERROR HANDLING	D
GAME CONCEPT	A–	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	B–	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B	GRAPHICS	D–	VALUE FOR MONEY	D

MONTY PLAYS MONOPOLY is a Lo-Res multiple player game that has a computer opponent. It requires the use of a monopoly board since the program does not display board positions. The computer does keep track of money; but the player must tell the computer the results of chance cards, dice rolls, and rents to be paid. The program does virtually no error checking for legal moves or plays.

REVERSAL

Company: Hayden
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A –	EASE OF USE	A	ERROR HANDLING	A –
GAME CONCEPT	B	SKILL INVOLVED	B +	DOCUMENTATION	B +
CREATIVITY	B	CHALLENGE	A –	HOLDS INTEREST	B +
GAME DEPTH	B	GRAPHICS	B +	VALUE FOR MONEY	B +

REVERSAL offers the Othello player a definite challenge. In fact, this program by the Spracklens of Sargon Chess fame is a quantum leap over other commercial programs. It won the First International Man-Machine Othello Tournament last year.

It is a strategy game where one must place a piece on a square (8x8 board) that causes at least one of the opponent's pieces to be trapped between your pieces. All of the opponent's trapped pieces are then "flipped" to your color. The object is to control the most squares. A simple game but difficult to master.

The program allows one to play against the computer, play against another human with the computer monitoring the game, or set up a particular board from which to play. There are 27 levels of play, 9 levels for each of beginner, intermediate, and advanced modes. The computer's response time, depending on the level, is from 2.5 sec. to 3 minutes. The board is normally visible, but the escape key will toggle the text page with its play by play listing. *There* are other features like a kibitz mode where the computer will offer advice (unfortunately the advice isn't very good), a take back feature, and faces on the counters that smile or frown depending on who is winning. (This can be suppressed.)

The computer's move entry is foolproof. A blinking cursor with only the legal moves is operated by the arrow keys. Each press of the key gives another possible move; the return key is used for entry. When the computer makes its move, it waits for you to press return before it actually flips over the pieces.

I found the program especially challenging on the advanced levels; in fact, embarrassingly challenging. Having beaten other programs relatively easily, I was beaten on advanced-level 4 several times by margins of 3 to 1. I settled down to the intermediate level.

QS REVERSI

Company: Quality Software
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A –	EASE OF USE	A	ERROR HANDLING	A –
GAME CONCEPT	B	SKILL INVOLVED	B +	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	A	HOLDS INTEREST	B +
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	A –

QS REVERSI may well be the Othello champion of the Apple II. Although the game hasn't been entered in tournaments as yet, preliminary bouts against Hayden's "Reversal" while playing at similar advanced levels based on response times, has resulted in QS REVERSI victories almost consistently. The play is brilliant at times, like two masters sparring against each other. We don't know why one can beat the other, but this version obviously has a much more efficient algorithm.

The program's graphics display and input routines are comparable to those of "Reversal's". The Hi-Res board is normally visible, but the text page, with its play-by-play listing, can be toggled by control keys. The move-entry routine is foolproof. Only legal moves, which are displayed via a blinking square whose movement is controlled by the arrow keys, can be entered. The computer waits for you to accept its move before allowing you to continue.

QS REVERSI, in addition to offering 12 levels of play, allows you to back up one or more moves so that alternative strategies can be tested. It also offers a tournament entry mode, which requires input for specifying the location of the letter column and number row. One can also handicap either the computer or oneself by giving one or more corners away. One last note: although this program can run on a 32K machine, advanced levels 10-12 require a 48K machine.

SPORTS GAMES

3-D SKIING

Company: Continental
Language: Integer & Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Disk*

3-D SKIING is a Hi-Res color 3-D game package containing two winter sports games. Both games incorporate the Budge 3-D graphics package as driver routines but have been obviously modified to incorporate color backgrounds.

SKI SLALOM is a fast action arcade style game in which a player maneuvers his skier down a regular slalom racing course. The object is to run the staggered gates in the fastest time. The player views the course as if he were closely following a 3-dimensional skier that can be turned side to side. The gates advance rapidly towards the player in true perspective as the skier advances down the course. As expected, there are crashes when he collides with a gate or runs off the course into the trees. The dynamic action is very much like real skiing. When the skier is turned slightly sideways by paddle control, the skier's velocity is braked slightly while he begins traversing sideways. Further turning causes a greater braking effect until a full stop is reached. Since the clock is running, braking will produce slower times. However, skiing too fast is very dangerous. The game does take a little time to master and this reviewer was often disqualified for hitting or missing a gate before the finish line. There are short and long courses as well as three levels of difficulty. The fastest time display is a goal for each player to beat. This game employs very fine state-of-the-art graphics; great for those inveterate ski devotees who're laid up with a broken limb or who would pass an evening in the lodge competing in simulated practice.

SKI JUMPING is a 2-dimensional Hi-Res version of the classic sport. One to four players take turns jumping for the longest distance on a 70-meter jump. There are actually three take-off positions at the lip of the jump. The game requires careful timing in using the paddle button to hit the middle or best take-off point for an optimum trajectory. Once airborne, the player can adjust the skier's lean for the maximum jump distance. Falls result from leaning too far over the ski tips and for not straightening up on landing. The three farthest jumps are displayed during competition. The game is cute and fun to play. It is also a game in which players tend to devote a considerable amount of time in attempting to maximize jump distance.

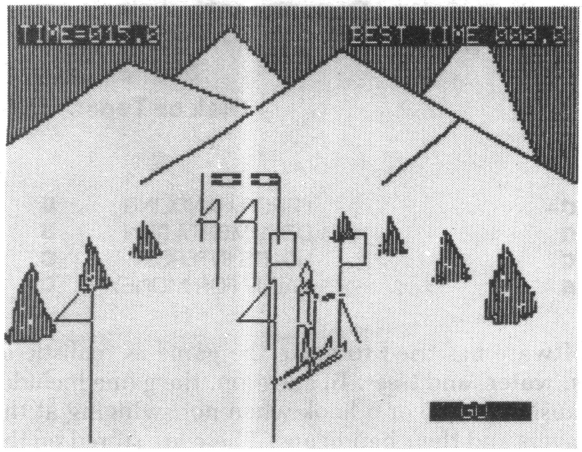
GOLF

Company: Instant Software
Language: Applesoft
Hardware Requirements: 32K

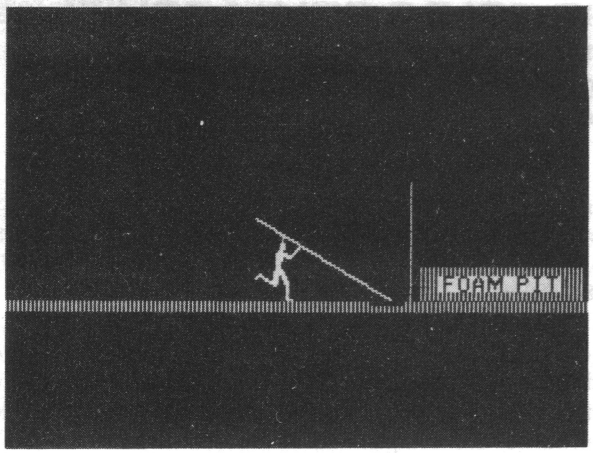
Department: Entertainment
Sugg. Retail: $7.95
Availability: 8
Disk or Tape: Tape

OVERALL RATING	C	CONTROLABILITY	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	C–	VALUE FOR MONEY	A

GOLF is an 18 hole golf game where one of two players attempt to complete the course with the least amount of strokes. The course is in Lo-Res graphics and is complete with water hazards, sand traps and trees. Club and shot angle are inputed by dialing the paddle. The trajectories of the shots are animated including bouncing off trees. Once both players reach the green, the computer switches the view to an enlarged green for the putting sequence. One advantage—the holes and hazards are chosen at random so that each time the game is played it appears to be a new course. A "best" value.



3-D SKIING



OLYMPIC DECATHELON

OLYMPIC DECATHALON

Company: Microsoft
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**A –**	CONTROLABILITY	**B +**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A**	SKILL INVOLVED	**B +**	DOCUMENTATION	**B**
CREATIVITY	**B +**	CHALLENGE	**B +**	HOLDS INTEREST	**B +**
GAME DEPTH	**A**	GRAPHICS	**A**	VALUE FOR MONEY	**A**

OLYMPIC DECATHALON provides the excitement and competition of the greatest and most demanding of all athletic competitions: the 10-event Decathalon. Normally a two day event, it requires participation in running, jumping and throwing contests that include the 110-meter hurdles, the discus throw, pole vault, 100 meter dash, the long jump, shot put, 400 meter dash, high jump javelin throw and the 1500 meter run.

The competition involves up to six opponents. Each event is presented with excellent animated graphics. The events are in real time and one must interact via the keyboard or paddles to manipulate the figures on the screen. As in real competition, the victor needs stamina, coordination, reflexes and timing. Points are awarded for each event and they are based on a comparison to actual Olympic standards.

Several of the events require running by alternately pressing two adjacent keys repeatedly (e.g., right and left arrows). The player who can do this the fastest using two fingers can win the 100 and 400 meter dashes. The longer races will test one's finger coordination and stamina, as cramps do occur. The javelin and pole vault also require reaching a maximum speed. However, coordination and timing also play a part as one must press a key to plant the pole, another to do a proper handstand and the return key to push the pole away before it hits the bar on the pole-vault.

Although some of the events are relatively simple, perhaps the high hurdles and the shot put are the most difficult in requiring good coordination. The hurdles require pressing each paddle button in sequence to successfully clear the barrier. Deliberately running through two hurdles is cause for disqualification. The shot put requires coordination of force levels. It soon becomes obvious that if the triceps aren't exerted slightly before the shoulder muscles, the shot put can be thrown almost overhead or even backwards.

The discus throw requires good hand-eye coordination while the long jump and high jump requires precise timing.

Any event can be practiced before the decathalon. Once the competition begins it doesn't end before the ten events are concluded. It takes about one hour to play with three people; about 15 minutes are added for each additional person. It is best to compete in even numbers of players (2, 4, 6) as the running events are paired and an odd player has to compete alone in several events while his opponents have the advantage of direct competition.

Microsoft was very thoughtful in preventing accidental resets during competition. Entering 3D0G will allow you to continue; for those with an autostart ROM the game continues without interruption. Microsoft also allows you to make one backup of their protected disk with a built-in copy program.

Overall, the graphics are excellent. The animation is smooth and the animated figures professionally styled. My only concern is that players, especially children, don't abuse the keyboard when switching to two-handed finger pounding during the excitement of competition in the running events.

PRO GOLF & GOLF ARCHITECT

Company: Shafer Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $50.00 combo ($30.00 each)
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	C+	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	C+

Golf fanatics will enjoy this Hi-Res color golf game. Shafer Software has tried to make the game as realistic as possible. The course has all the natural hazards: roughs, sandtraps, water, and trees. In addition, the game includes possible wet courses, slope to the green, and the randomness of causing a slide or a hook when not swinging at the optimum level for a particular club. One can also keep track of players and their handicaps. These are stored on the disk for later play.

The graphics are nicely done, although entering club direction and strength of swing is kind of cumbersome for each shot. It would be nicer to follow Instant Software's example of dialing the input values on a paddle. Since the disk isn't protected, one might attempt the change.

The second module, GOLF ARCHITECT, allows you to design and change your own personal golf course. One uses a 28 x 16 grid where the various types of terrain are entered by keyboard. The Hi-Res course is displayed as you enter the symbols. First the course is created, then the green. Each hole is saved to the disk. Later, one can make changes to the course by using the editor.

The documentation, which is in two separate booklets, caters to the player who is only vaguely familiar with the Apple. The golf game is expensive. Since one would get bored playing the same course several times, my advice is to buy the combination package to allow you to design your own game.

APPLE BOWL

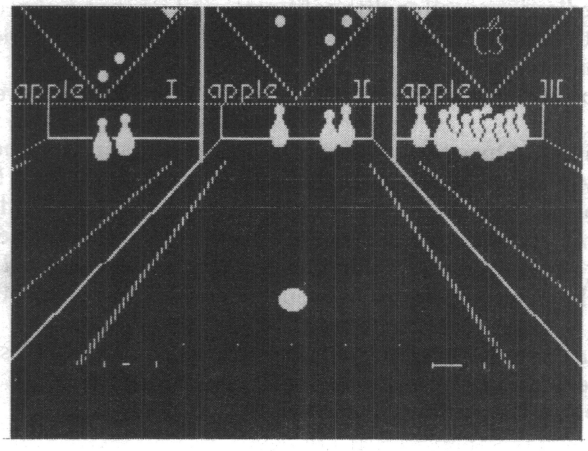
Company: Apple Computer Inc.
Language: Integer
Hardware Requirements: 16K

Department: Entertainment
Sugg. Retail: $25.00
Availability: 9
Disk or Tape: Disk

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C–	GRAPHICS	A	VALUE FOR MONEY	B–

APPLE BOWL, from Apple Computer, Inc., won a prize for the best graphics game in 1979, and justifiably so. The graphics are so realistic in this bowling game for one person that it seems perfectly natural that two other games are going on in adjacent lanes in this three dimensional bowling alley. Even automatic pinsetters drop down to pick up fallen pins.

The game is controlled by adjusting spin and speed and choosing a release point on the alley. The dynamics of the game are the same as in real bowling, so that it is impossible to get a strike by simply rolling the ball straight down the alley. The game is challenging in trying to obtain a high score. It is an excellent value for the required nominal stipend (also, for the dough).



APPLE BOWL

HI-RES FOOTBALL

Company: Sierra On-Line
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

GAMES

OVERALL RATING	B–	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	B
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	C+

Hi-Res Football is an outstanding real-time action game for either two players or for offensive practice against the computer. The game fields have two seven-player teams made up of "X's" and "O's," just like the coach used to diagram on the chalk board while we tried to stay awake long enough to absorb the plays. Movement occurs on a field consisting of 40 yard segments which shifts as the players advance. The game, which is controlled by paddles, follows the standard football rules. You may choose 11 offensive plays and nine defensive plays by turning the paddle, followed by pressing the button. Since your opponent would have no trouble seeing your choice of play, the offense can change the plays displayed on the screen before the defense can respond to the start of line action. To further hide your intentions, all offensive plays, whether passing plays or running types, have the same scrimmage lineup. Defensive plays have four alignments from which defenders may rush in two or three different directions.

The two players actually have only full control of one player: the quarterback for the offense and the free safety for the defense. The rest of the team follows the preselected play. These two players are controlled by the paddles. Turning a paddle a slight turn causes a player to shift from side to side on the field, while turning the paddles further causes the player to advance or retreat down the field. During a pass play, the quarterback can partially steer the ball; if the pass is complete, control is transferred to the receiver.

The graphics are extremely well done. No attempt was made to make the players look like men. The players depicted as X's and O's at first seem poorly done; however, after playing the game awhile, the letters seem a logical choice. The game has two speeds of play and levels of difficulty. In both cases, the graphics are smooth. There is only one bothersome feature which occurs sometimes in a long downfield run with the safety chasing your ball carrier. When the screen shifts to another section of field, the defensive pursuer is then off screen. One can inadvertently move the ball carrier to a position that allows the defensive player to nail the runner.

Overall, I think football fans should consider this one.

COMPUTER QUARTERBACK

Company: Strategic Simulations, Inc.
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: Off-the-shelf
Disk or Tape: Disk (Protected)

OVERALL RATING	B	EASE OF USE	A	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B	GRAPHICS	C–	VALUE FOR MONEY	B

COMPUTER QUARTERBACK is a real-time simulation of an NFL football game that makes good use of Strategic simulation's modeling techniques used in their war game programs. A single black-and-white display compactly presents a well-annotated football field, a score board, last play results, and both offensive and defensive team alignments. Paddles are used to select offensive/defensive plays (which are also shown on the score board by numbers), and to put the ball into play.

Two players may compete in either a Semi-Pro or Pro version, which differ as to the team selection and capability determination and the relative number of play selections. Alternately, a single player may compete against the Apple Robots in a Semi-Pro setting. The game plays reasonably quickly, despite rather distracting delays between plays, and quite easily against a real-time clock, and develops a good sense of player involvement.

Despite a rather awkward and involved booting and start-up process, the game can be learned quickly and easily. It is much more difficult to master and understand the probability determinations or to assess the accuracy of the modeling interactions. Certainly, the same offensive plays produce a variable result against a given defense, and in the single-player game, the Apple employs a reasonable and varying set of play selections as a function to field-position, time remaining, and score.

If you are looking for a trivial football game with colorful displays, sound effects, and a superficial play selection, then try a different program. However, if you are an arm-chair football freak, COMPUTER QUARTERBACK is an excellent value that will provide a high level of non-repetitious challenge.

HI-RES SOCCER

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B**	DOCUMENTATION	**C+**
CREATIVITY	**C+**	CHALLENGE	**B**	HOLDS INTEREST	**B–**
GAME DEPTH	**B–**	GRAPHICS	**A–**	VALUE FOR MONEY	**B**

HI-RES SOCCER is an arcade type simulation for two players or, at the beginners level, one player against the computer. Each player manipulates, by paddle control, all the men on an eight-player team. Dribbling, passing, kicking, and stealing the ball are all possible in this realistic game.

One game paddle controls every player's movement, depending on where they are and how close they are to the ball. Individual players, except the goalies which move only up and down, may move in one of eight directions, depending how the paddle is set. Players face the direction they are running. This helps beginners in placing an arrow on the paddle to remember which setting moves in which direction. The direction of the ball carrier is easier to judge, since the position of the ball in relation to the player's foot not only determines the direction of travel but the direction of the kick. There are 28 directions for passing and kicking. Paddle control is tricky and somewhat difficult to get used to. It does take a good deal of practice before one becomes a proficient ball handler.

There are three levels of play. The beginner's level is equivalent to indoor soccer. Since the ball bounces off the walls, beginners don't have to worry about corner kicks and throw-ins. The intermediate level allows the ball to go out of bounds at the goal ends. The team kicking the ball out loses control and the goalie gets a free kick. The advanced level includes out of bounds on all four sides.

Corner kicks, throw-ins and goalie kicks have all been simulated properly. Since there are balls kicked into the air, they can't be caught until after a short delay. This allows you to kick over players' heads.

The graphics are very nicely done with the players resembling soccer players. Color is the preferred mode, with green and purple teams used for easy identification. It is somewhat difficult to discern the difference between striped jerseys and regular jerseys in the B&W mode.

This is truly a scintillating game, utilizing excellent, smooth-flowing Hi-Res animation and challenging play.

FORE

Company: Automated Simulations
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**C–**	EASE OF USE	**B–**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**B**
CREATIVITY	**C–**	CHALLENGE	**C**	VALUE FOR MONEY	**C**
GAME DEPTH	**C+**	GRAPHICS	**C–**	HOLDS INTEREST?	**C–**

As one of the numerous golf games for the Apple, *Fore* has both strong points and weak points. The game is in Lo-Res. This is not to say that it has inferior graphics, because the intention was to put a lot of color on screen to represent the terrain features. This game has water, sand traps, trees, light, and dense rough. The game has two 18 hole golf courses, each hole requiring either an entire screen, or, if short holes, two are shown on the same screen page.

The play of the actual game is somewhat cumbersome with the choice of controls. This is a keyboard game. While some golf games use paddles to aim the club, *Fore* uses a keyboard-moveable dot to approximate the impact on the course. The impact is actually determined by wind direction, selection of club, and strength of swing. However, moving this dot is done by the U, D, L, R keys, which just happen to be scattered all over the keyboard. A better choice would be the I, J, K, M diamond. The club is chosen by a single letter and a choice of probable distances using various strength swings. Once hit, the ball moves slowly across the screen. Hitting the water causes a repeat of the shot with the penalty of a stroke. Getting the ball caught in a sand trap or in the trees has its problems. And when the ball finally reaches the green, there is no closeup of the green as in other games, but a simplified direct putt on a green with no slope.

The game is definitely medicore, better than some golf games, but worse than several others. While the action is somewhat realistic at times, especially in that accuracy is lost with harder swings, it suffers the lack of putting greens and a poor choice of control. The game is OK if your golf game is rained out.

HI-RES COMPUTER GOLF

Company: Avante-Garde
Language: Applesoft & Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A	CONTROLABILITY	A	ERROR HANDLING	A
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	A+
CREATIVITY	A	CHALLENGE	B	HOLDS INTEREST?	A
GAME DEPTH	B	GRAPHICS	A+	VALUE FOR MONEY	B

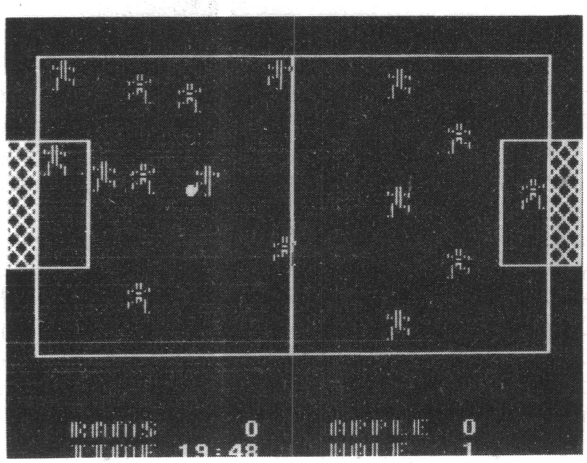
Hi-Res Computer Golf is a single-disk, two-sided, and brightly-colored Hi-Res game that comes closer to simulating a true golf game than one might have thought possible. Side one permits 1 to 4 players to play any of five 18 hole, par 72 courses, with a color bar calibration. The other side offers a demo game, the opportunity to practice the swings, and a practice hole.

The degree of simulation is such that *Hi-Res Golf* is essentially starting where earlier golf games for the Apple have left off. Virtually the only things that you don't get are the fresh air and the physical exercise, although one finger gets a good workout. As with real golf, it's the swing that's the key: you must time your swing properly by guiding it through the groove displayed on the screen, somewhat akin to an *Olympic Decathalon*. A good sense of timing takes practice, and much of the initial time with this game should be spent on side 2 of the disk, which is well-keyed to the documentation on a paragraph by paragraph basis. Together, they lead the novice through the game's features in a manner that many other software houses could well note.

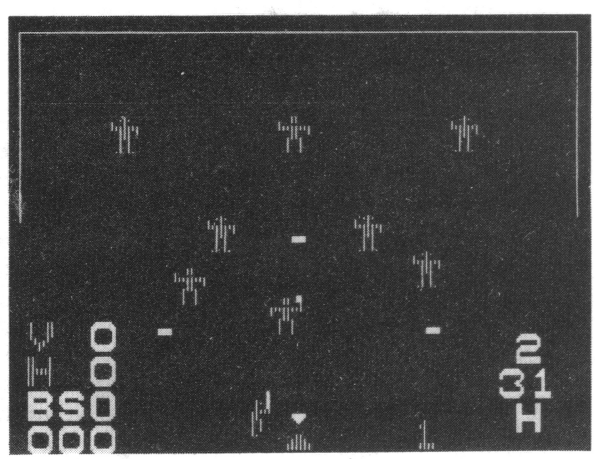
If the swing doesn't hit the ball squarely, strange things happen; hooks, slices, undercutting, and topping of the ball are all simulated. Naturally, you can't swing until you choose the right club from your bag. There are 2 woods, 5 irons, and a putter to choose from, each with its own trajectory and range as a function of how hard you hit it (1 to 10). Sand and water traps, trees, roughs, boundaries (ricocheting occurs, sometimes, from the trees), all exist in different degrees and sizes to complicate your game, as if the variable wind and the contoured greens weren't enough. Each time a course is played, the hole sequence, tee location, green coutours, and hole location are different.

The program provides logical and easily remembered system commands, such as a table of distance and swing strength versus club type, and Hi-Res view of the green and the fairway (many requiring multiple screens). A score sheet, a hard copy of which can be printed at the end of the game, can also be called. A distance scale is also available, but only on the beginner's course. Thus, judging distance plays a significant role on the tougher courses. Aside from a long header, there are two weaknesses; the first is having to reselect the club, swing strength, and direction after missing the ball, rather than using the last set as default values. The second is that the current game status is constantly written to the protected disk; while it may be optionally restarted, a second game cannot be played without wiping out the "saved" game.

Hi-Res Computer Golf is both a challenging and a well-implemented game. Excellent documentation is provided to ease the learning (perhaps it should be called "training") phase. Even if it isn't a rainy day, good golfers could get hooked into staying in front of the Apple, to say nothing of everyone else in the family.



SOCCER



BASEBALL

MICRO GOLF

Company: Creative Computing Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	B+	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C+

MICRO GOLF brings the game of miniature golf to the Apple. Miniature golf differs from the regular 18-hole variety in that it is played with a putter on a very small course with numerous obstacles. Sometimes, the course consists of a maze for each hole, while at other times it presents a series of obstacles that must be traversed without bouncing the ball back from where it came.

This game is either paddle- or keyboard-controlled, designed for one to four players. In the paddle mode, one paddle aims the club, while the other adjusts the force. The button swings the club. The disk includes three courses. Two of them are your standard courses, while the third displays each hole in the shape of an animal.

You can create your own miniature golf course if you tire of the three offered. The hole editor is keyboard-controlled. The boundaries of the hole are created by positioning a cursor about the screen. Each time Ctrl-A is entered, a point is added to your line data, which connects this point to your last point in creating a line. You can also add internal obstacles with similar commands. Editing is easy with the add-a-point or delete-a-point modes. After you have completed drawing a hole, you indicate where the cup is and also the initial starting position of the ball. Upon completing 18 holes, you have designed a complete course. Individual holes can be reedited at any future time if you wish to fine tune your course.

MICRO GOLF is a very easy-to-use package. The graphics are presented in simple black and white line segments, which do not detract from the game. The game is fun to play, especially if you enjoy trying multi-banked carom puts which require both a good eye and lots of luck.

COMPUTER BASEBALL

Company: Strategic Simulations
Language: Applesoft, Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	A	CONTROLABILITY	A	ERROR HANDLING	A
GAME CONCEPT	A	SKILL INVOLVED	C	DOCUMENTATION	A
CREATIVITY	A	CHALLENGE	B	HOLDS INTEREST	A
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	A

An owner of SSI's BASEBALL might be surprised to hear that there was a 1983 Major League strike, since he could watch games between any of the 26 World Series contenders while immersed in baseball on the Apple. Excellent versatility marks this game; the computer can manage one or two teams or let the Apple handle both while permitting demo, solitaire or two player games. Its demo mode on the menu pits the 1980 AL and NL champions against each other; however, any teams can be called into play in this mode. For any of the modes, you select any two teams you wish, set up your own teams (cheat by having nine .400 hitters), or have one team play against itself using different pitchers or batting orders.

This is not a high-action game, but rather one involving managerial skill, with Hi-Res animation definitely taking a back-seat. The playing field display, however, is attractively and efficiently laid out. Action for each batter requires a single "pitch," which he may hit, be struck out by, walked, or reach base on an error. The batting, pitching, and fielding averages and characteristics of each player are unique, with each handled accordingly. Even good fielders will occasionally make an error, sluggers may pop up, and pitchers will tire (who, by the way, require a warm-up period). Each "Manager" controls his bull-pen and bench of pinch hitters and, like a real-life manager, once the decisions have been made, can do nothing more than sit back and watch.

A major achievement of BASEBALL is the simplicity of command required in playing a simulation of this complexity. Complete control is provided by use of a single paddle (as well as from the keyboard). BASEBALL'S versatility and low price for this well-modeled simulation result in a very realistic game that would be a bargain even at a higher price.

COMPUTER MAJOR LEAGUE

Company: Microcomputer Games (Avalon Hill)
Language: Applesoft
Hardware Requirements: 48K Applesoft, Disk Drive

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Both

OVERALL RATING	C	CONTROLABILITY	B	ERROR HANDLING	D
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B	GRAPHICS	N/A	VALUE FOR MONEY	C

Avalon Hill's COMPUTER MAJOR LEAGUE package contains all of the 1982 Major League teams and permits match-ups to be played in an all text display of a baseball game. Player characteristics are reasonably well-modeled, but not to the degree found in SSI's Baseball. The game plays quickly and is easily implemented , and, while basically a two-player game, solitaire play is also quite easy; however, the player must make the decisions using simple keyboard commands for both sides.

The disk version is recommended over the cassette version due to the team loading process; the ratings above are based on using the disk. There are several surprising programming errors which can be easily corrected on the unprotected disk. The menu lists an extra "Hit & Run" Command, (H), which is in error and should be deleted. Also, an END command is recommended; as it stands, the Home team can play an infinite number of outs in the bottom of the ninth inning, although after each play the end music and inverse "Final" is repeated.

In overall comparison to the somewhat more expensive Baseball, Avalon Hill comes off second best. The display is rather busy, to say the least, and the versatility and game realism offered by SSI is quite lacking in COMPUTER MAJOR LEAGUE. A usable lineup for each team is offered, but can be easily overridden (thank Heaven — what baseball fan would even THINK of having Brett bat ninth in the order? Defining your own teams, while possible, requires referring to the board game on which the computer game is based, and using your own text editor. The two advantages over Baseball are the use of last year's 27 team rosters and a faster game in terms of elapsed time (i.e., approximately 20-30 minutes versus about an hour).

BASEBALL

Company: Datamost
Language: Assembly Language
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	C-	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST?	C-
GAME DEPTH	C+	GRAPHICS	B	VALUE FOR MONEY	C

Excellent Hi-Res graphics baseball game for two people. Uses paddles to control type of pitch, handle the outfield and bat. Defender must "run" down ball in outfield and throw to the proper base. Fielding control is slightly difficult to master. Moving the paddles slightly moves the fielders side to side, while turning the paddles further causes up and down movement. The controls are a compromise for Apple's lack of a joystick. The game is thoroughly enjoyable and one of the better sport games for the Apple II.

GAMBLING & CARD GAMES

THE WORLDS GREATEST BLACKJACK PROGRAM

Company: Apple Special Delivery
Language: Pascal
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $50.00
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B–
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	C+

This package is intended for the person who wishes to learn to play blackjack to win!! The game has nine variations of play which cover all the standard options in the casinos. These include the dealer standing on soft 17, insurance, pair-splitting, and others. You are allowed to have from one to six players and up to six decks of cards. The play can be controlled by the player or the computer, each with different strategies. Other nice features include practice drills on basic strategy and hi-opt card counting.

Using basic strategy, the player has about one-hundredth-of-one percent advantage against the house. When a player uses card counting techniques, he gains about a 1 to 2 percent advantage over the house. This may not seem like much; however, if the player bets high when the cards favor him, he can ream the casinos to the point of being evicted from the premises (just kidding, High Rollers).

APPLE 21

Company: Softape
Language: Integer or Applesoft
Hardware Requirements: 24K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 9
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	A	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	B–	GRAPHICS	B+	VALUE FOR MONEY	B

APPLE 21 is a blackjack game for one to three players who play against the dealer. The graphics feature Hi-Res playing cards. The game follows the usual Las Vegas rules. Input is accomplished by keyboard commands. The computer's response time is excellent. This game has to be considered a buy.

CRAPS

Company: Softape
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C–
GAME DEPTH	C	GRAPHICS	B–	VALUE FOR MONEY	C

Craps is a Hi-Res gambling simulation of a Las Vegas crap game. Players can place bets, play the field, passline, and hardway rolls. There are two displays, an inner and an outer table. The dice rolls are animated on screen. The program allows the optional use of a light pen.

DRAW POKER

Company: Softape
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	A–	ERROR HANDLING	A–
GAME CONCEPT	B–	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	C
GAME DEPTH	C–	GRAPHICS	B+	VALUE FOR MONEY	C+

DRAW POKER is a very sophisticated version of the card game, pitting one player against the computer. The use of Hi-Res cards is excellent; they include a shuffle-and-cut routine that sounds like a real deck of cards. The computer can play at two levels. It does bluff on the higher level, but its poker sense can only be considered fair-to-good. Its user interface is well-designed. One uses the arrow keys to make selections involving what to discard and whether to raise or call, then presses the return key to indicate the selected option. This appears to be the best draw poker game on the market.

POKER TOURNAMENT

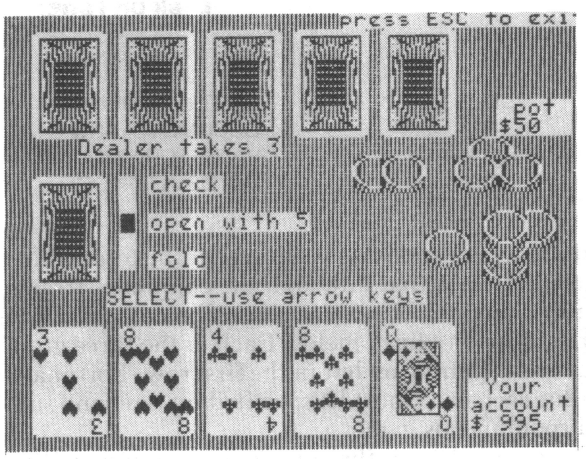
Company: Adventure International
Language: Applesoft
Hardware Requirements: 32K, disk drive or cassette

Department: Entertainment
Sugg. Retail: $20.95 (Disk)
Availability: 7
Disk or Tape: Both

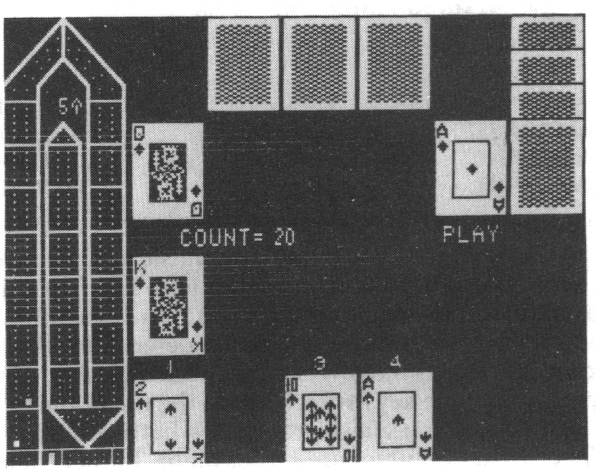
OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	C+	VALUE FOR MONEY	C

Poker Tournament presents the classic game of straight draw poker in a friendly western setting, the hotel saloon. Five old timers, Slim, Doc, Bart, Tex, and The Kid challenge you and enliven the game with a variety of western and poker jargon that describes their moves. Players each start with $1,000. The computer's players are adequate and bluffing is common. Play can be ended after each hand. Players can go in the hole, but then the bank will advance everyone another thousand to even things up.

The game is text-oriented, and the cards consist of rectangles with number and suit only; however, the table and chairs are pictured in the text. The screen formatting is exceptionally well done for a text game.



DRAW POKER



HI-RES CRIBBAGE

COMPUTER GIN RUMMY

Company: Datamost
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B+	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	B–	CHALLENGE	B	VALUE FOR MONEY	B
GAME DEPTH	B	GRAPHICS	A–	HOLDS INTEREST?	B

Computer Gin Rummy plays a wicked game of rummy in this slick version of the classic game. Actually the computer plays three versions of the 10 card game. *Gin* allows the opponent to lay-off cards on the declared hand if a knock is made with a hand containing 10 points or less of unmelded cards. KNOCK allows the player to knock immediately or at any time in the game. There are no lay-offs in this version. ONE-MELD requires a completely melded hand for a player to GIN. This requires a hand consisting of 4, 3, 3, or two 5 card runs.

The outstanding feature of this game, besides its fine graphic display of the Hi-Res cards, is the game's ease of use. The game operates entirely by one stroke key commands. The player's entire hand, including the drawn card, is displayed with letters A-K beneath it. Thus, if a hand is to be rearranged, one simply indicates where a particular card is to be moved, or if a card is to be discarded, which card. A mistaken discard can even be taken back if the order is countermanded with another keystroke before the computer displays the discard on the pile (3 seconds). Any additional prompts, such as rearranging your hand if needed after the computer gins, or for laying off on the computer's hand, are automatically supplied.

The computer provides a very good opponent. While it is difficult to judge a computer in a game that requires luck, this program apparently knows the odds and definitely knows when to knock. The program has a very good algorithm for arranging your hand to give you the lowest possible point count if you lose. It saves you considerable time in rearranging your hand during the game. In fact, if you were to gin with a completely unarranged hand, the computer would know if this were legal.

One additional feature available in the game ONE-MELD is the display of all cards including those from the deck that haven't been drawn. This is offered because the computer doesn't display its losing hand. And while the instructions assume you already know the rules of the game, for those that don't, there is always Hoyle's "Rules of Games." Do remember that aces are always low in rummy. In sum, *Computer Gin Rummy* is the best and easiest to use of the Gin Rummy games on the market.

THE OLDE GIN PARLOUR

Company: Dynacomp
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $22.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	D	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	B
CREATIVITY	B–	CHALLENGE	C+	VALUE FOR MONEY	B–
GAME DEPTH	C	GRAPHICS	C+	HOLDS INTEREST?	D+

The Olde Gin Parlour plays the classic card game of gin rummy where knocking is allowed if the total point count of all unmatched cards is less than ten. The first thing that one notices is that although the computer arranges the player's hand by rank within a suit, cards require a considerable amount of rearranging. The computer program isn't smart enough to automatically determine which cards are grouped to form melds. Each of the three groups are arranged in the three rows below the dealt hand. All cards that aren't paired are left in the first row. Fortunately, all input is by single keystroke without the use of the return key. But each card must be specified by rank and suit. This slows things down considerably in what is usually a fast and spontaneous game.

The Hi-Res graphics are rather plain. Rather than using large detailed cards that require overlapping to fit on the screen as in a real game, the author chose smaller cards that only show the rank and suit.

The computer, as an opponent, plays a mediocre game of gin rummy. Although the program is worthwhile, the user interface and necessary rearrangement of cards does not make the game pleasurable to play.

KING CRIBBAGE

Company: Hayden Book Company
Language: Applesoft/Assembly
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C+	DIFFICULTY	B	ORIGINALITY	A
PUZZLE QUALITY	C	EASE OF USE	C	DOCUMENTATION	B
TEXT QUALITY	C–	VOCABULARY	C	HOLDS INTEREST?	C
GRAPHICS QUALITY	C	SAVE/RESTORE	B	VALUE FOR MONEY	C

Hayden's *King Cribbage* is the third solitaire cribbage game presently available for the Apple, competing with On-Line's *Hi-Res Cribbage*, and Rainbow's *Cribbage*. Reviews of these programs are on page 304 of *The Book, 1982*. There are no significant new features offered, but it does have its own distinctive personality, including both the good and bad.

The playing algorithm is quite good, comparable to Rainbow's, and plays an even, steady game with few wierd hands. Keyboard operations are the simplest of the three, although the other two are not at all difficult. The game has a consistent and steady pace easily controlled by the player, unlike Rainbow's, which tends to push one along.

The display field is attractive, but does not compare to that of On-Line's. The serpentine shaped playing board, although arty, makes it difficult to know where the Skunk line is, and it does not provide a numerical indication of the points by which one is ahead or behind. A scoring summary is easily available on a separate text page. The cards are the largest and best drawn of all; but the game is difficult to play on a B&W set since the blue peg used by the Apple becomes a very difficult to see shade of gray. On-Line still has the best overall layout, appearance and functional display, but Hayden isn't too far behind.

For the beginner, Rainbow's tutorial documentation and on-screen scoring possibilities may well be worth $29.95. At $24.95, Hayden affords a better layout, an equal playing algorithm, an option to shut off the monotone sounds, and an option to permit the player to count his own hand (Muggins). For the more advanced player, provided he can tolerate a rather high rate of wierd hands, the On-Line game, also at $24.95, is still on top. Apart from its better layout and its on-screen scoring summary, it is the only one to provide tournament and save-game capabilities as well as having a clever use of sound. It is also the only one to permit the player to retract the first card placed into the Crib, a feature used surprisingly often. However, Hayden's *King Cribbage* runs a close second, and should give the others a good run in this three-way race for your money.

CRIBBAGE II

Company: Computek
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C

CRIBBAGE II is the successor to Rainbow's "Cribbage" (see Page 304 of THE BOOK for 1982), and is an improved game in many regards. External documentation provides the beginner with a tutorial, as well as detailing several of the game's new features. These include (S)ound on/off, (D)elay speed control for screen refreshing, and (F)reeze control to hold a position for study. An option for playing, using either the paddle or the keyboard, has also been added. The major noticeable improvement includes the addition of a (H)elp command, which displays ALL possible four card hands together with their scores; a significant teaching aid.

An additional improvement seems to have been made to the randomizer, as there seem to be fewer unusual or "fantastic" hands. CRIBBAGE II's play response speed is extememly fast, but even with the incremental Delay control, the response time takes some getting used to. The playing algorithm seems somewhat more accurate as well, making the game seem more "real". The Hi-Res graphics has been completely redone, with slightly larger, more readable cards and a better scoreboard layout; the overall display still falls short of the superb card and display graphics (combined with use of sound) in the less expensive "Hi-Res Cribbage" by On-Line.

The trade-off between these two cribbage games has become much closer with the tournament features, save ability, sound, and graphics still favoring HI-RES CRIBBAGE. On the other hand, CRIBBAGE II excels in its overall tutorial abilities and a somewhat better playing algorithm.

BRIDGE TUTOR (Basic Version)

Company: APPLE Special Delivery Service
Language: Integer Basic
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $40.00
Availability: 5
Disk or Tape: Disk (2)

OVERALL RATING	**D**	EASE OF USE	**D**	ERROR HANDLING	**B**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**C**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST	**N/A**
GAME DEPTH	**N/A**	GRAPHICS	**C–**	VALUE FOR MONEY	**D**

BRIDGE TUTOR is a two-disk, two-version program for self-taught Bridge based on the American Standard (Five-Card Major) system. The Basic Version (which is reviewed herein) is intended for the beginning player and provides both instruction and quiz phases, using randomly dealt hands. It is not intended as a Bridge playing system.

The menu-driven program can be used with either one or two drives. The instructional menu offers chapters on beginning Bridge, bidding, scoring, playing and selection of opening leads. Most of these options provide sub-menus for related aspects, using neatly formatted text pages and rather staid Lo-Res displays. The quiz phase, located on the second disk, offers questions on counting your hand, selecting opening leads against both no-trump and suit contracts. The Basic Version's menu also claims that it offers practice on the Precision Club and Scientific Bidding Systems, but these options exist only on the Expanded Version; selecting them will result in bombing the program.

BRIDGE TUTOR teaches a very constructive version of one of the more popular Bridge systems. In its Absolute Beginner phase, it is initially almost too basic, then jumps rather rapidly to a moderately complex level where the feedback to erroneous answers leaves much to be desired. The section on opening leads is rather well done, but in general the program leaves much to be desired as an instructional program; it is more an introduction to Bridge, rather than an exhaustive or even full treatise for the beginner.

Suit-preference signals are not addressed at all, while the advertised treatise on the Jacoby Transfer is a mere so-so definition and descriptions of the Gerber, Blackwood, and Stayman methods are super-brief, to say the least. Some "correct answers" to the quiz phase are astounding: passing a 13 point hand with a good six card minor, plus providing a lead hand which resembles a distributional nightmare, causes one to wonder how the declaring team could have reached their no-trump contract. At $40 for the Basic Version (and, of even lesser value, $60 for the Expanded Version), a lot of excellent, easily-read and far more complete books on Bridge can be obtained (although not at a Computer Store).

BRIDGE 2.0

Company: Artworx
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $21.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**B**
GAME CONCEPT	**C**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C+**	CHALLENGE	**C+**	HOLDS INTEREST?	**C**
GAME DEPTH	**C**	GRAPHICS	**N/A**	VALUE FOR MONEY	**C**

Bridge 2.0 allows you to play contract bridge with the help of a computer partner against two other computer opponents. The program consists of two parts: bidding for the contract, and playing out the hand, either as declarer or as defender. This ability to play defense against two computer opponents is rather unique, and this was the first microcomputer program to do so.

The bidding follows Goren's point-count bidding system, but because of memory limitations it only incorporates the most fundamental features. Most of these features are explained in the documentation. Don't expect to be able to change to a third suit if you respond with a bid different from the suit with which it opened. Doubles and No Trump are perfectly acceptable. Overall, the program will respond properly around 70% of the time.

The hand is played out in a text display. The display is nicely formatted, and the cards are arranged by rank and suit for your hand, and for your partner if you are the declarer. A king of diamonds is played by typing KD. The computer opponent isn't very good, lacking finesse in play.

Avid Bridge players will find fault with this program. Apart from the limitations discussed above, the computer cheats. In an attempt to develop an algorithm that could play both offense and defense in a limited amount of memory, it was necessary to allow the computer some knowledge of its opponent's hand. While this may not be fair, the computer still doesn't play very well. The game is much more suited to the novice or average player.

BRIDGEMASTER

Company: Dynacomp, Inc.
Language: Applesoft
Hardware Requirements: (less than 48K, but ?)

Department: Entertainment
Sugg. Retail: $21.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	D
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C–
CREATIVITY	B	CHALLENGE	C+	HOLDS INTEREST?	B
GAME DEPTH	B	GRAPHICS	N/A	VALUE FOR MONEY	A

Bridgemaster is the successor to DYNACOMP's *Bridge 2.0* and is the best of the four known Bridge games currently available for the Apple; unfortunately, it still leaves a lot to be desired. *Bridgemaster* offers 1,000 different hands on a neatly laid out, B&W, all-text playing field; duplicate scoring; and running score sheets for different players. It does not provide a "Claim" feature, so all hands must be fully played out.

At present, the disk is provided in DOS 3.2 only. However, it is not protected and may be MUFFINed up to DOS 3.3, and may also be revised to suit your whims and programming ability. The review disk suffered badly from several syntax errors, one of which bombed the program whenever N or S tried to open the bidding. The verified fix from DYNACOMP is to copy down lines 850 and 910 of the program SET DEAL, and replicate them exactly as lines 850 and 910 of DEAL.

The documentation is somewhat long on hype and short on game bidding conventions and menu descriptions. It supports doubles, pre-emptive bids, Blackwood, and Stayman (read the documentation carefully on this one). Given the proper holding, your partner will jump overcall or jump shift your opening bid, but he will seldom overcall an *EW* opener, even when holding an opening hand himself. North is not prone to shift suits or support your second rebid of a major, even when holding three small cards. Your North partner loves to bid four card suits - again and again, even if he has two other biddable (and higher ranking) four card suits. He seems to keep bidding on the basis of combined point count, pushing his suit until he reaches the correct level, with the proper suit being left to you as South.

Bridgemaster plays EW hands offensively as well as defensively, but the play is conservative and predictable. When NS is defending, the computer plays the concealed North hand. All closed hands have the unfortunate penchant of leading aces and kings off the top, although an ace may be underled against No-Trump contracts. Against a suit contract, an EW declarer always pulls trump, even at the cost of losing trump control; an offensive cross-ruff algorithm is not provided. The game plays without finesse, so why should you? At least it will usually play second hand low.

The speed of play to each trick is excellent; there is a five second delay after the last card to each trick is played, and a lengthy delay before getting on to the next hand. Preset hands are supported, but can't be saved. *Bridgemaster* won't take the place of a good instruction book on learning the game; but it is a step in the right direction, and will give a novice good play as well as practice in getting upset with his partner. Intermediate players will be astonished to find that their game has suddenly improved. Advanced players will have to wait awhile for a good challenge.

GO FISH

Company: Dynacomp Inc.
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $18.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	A–	ERROR HANDLING	B+
GAME CONCEPT	B	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST?	C+
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

Go Fish is the computer version of the classic children's card game of the same name. Basically, it is a game against the computer that is very good at improving memory skills. Two opponents, who have been both dealt five cards, attempt to form groups of four for the rank of the cards that they hold in their hands. They accomplish this by "fishing" for them from their opponents cards. If successful, they can try again; otherwise they take a draw card from the deck.

The game is very simple to play. The cards are shown graphically, and automatically arranged by rank in the player's hand. The keyboard inputs are single key, and the computer will not allow illegal inputs. Thus, a young child of six or seven will have no trouble using this program. As to the computer's skill: it plays a mean game of Go Fish. This is expected, because computers, like elephants, never forget.

HI-RES CRIBBAGE

Company: On Line Systems
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A–	EASE OF USE	A	ERROR HANDLING	B+
GAME CONCEPT	B+	SKILL INVOLVED	B+	DOCUMENTATION	B
CREATIVITY	B+	CHALLENGE	A–	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	A–	VALUE FOR MONEY	A

On-Line Systems has come up with a real winner in HI-RES CRIBBAGE. The graphics are outstanding, with a neat, crisp and realistic layout (the modernistic board design is especially well done), the cards are nicely-sized and well-designed. The game also uses sound in an interesting and effective manner. Besides that, it plays a pretty wicked cribbage game!

The game goes to the first winner of six 121-point games and permits in-process games to be halted and saved at any point (but NOT on the game disk due to the non-standard DOS). The program is unusually fast in its response, presents the scoring in an incremental, easy-to-follow form, and in the fast response mode is fast enough to warm the heart of even an experienced player.

The game's faults are few and minor: the character set for the cards makes the suits difficult to readily distinguish and there are an unusually high number of double-runs encountered in the hands (especially the computer's). The program makes occasionally strange discards to the crib, but since it won 65% of the games played, who am I to argue? (The program has no error messages for wrong moves; instead, it just ignores your command.) The otherwise good documentation combines instructions for the game with a beginner's lesson in how to play cribbage that is rather confusing and is not recommended as a means of learning the game.

HI-RES CRIBBAGE is one of the slickest and best integrated of programs to come along for quite some time. If you don't know how to play the game, the availability of this program is in itself a good reason to learn.

MILESTONES

Company: Creative Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	B–
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B

Milestones is modeled after a French playing card game where you try to complete an auto trip of 700 miles per each hand of cards. It is a one-player game played against the computer, wherein the first to score 5000 points wins.

The deck consists of 101 cards of four types: distance cards, which add mileage to your trip; hazard cards, which can be played against your opponent to stop or slow him down (stop lights, flat tires, accidents, etc); remedy cards, which can be used to counter your opponent's hazard card; and four safety cards, which save you from various hazards while playing your hand.

During each turn, you play cards to either speed your own progress and accumulate mileage, or to slow down the computer. You have seven cards in your hand. Cards that are useless can be discarded back to the pile.

The game is nicely implemented with Hi-Res cards. Card players might find this game somewhat novel.

HEARTS

Company: Artworx, Inc.
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C–
CREATIVITY	C	CHALLENGE	C–	HOLDS INTEREST?	C
GAME DEPTH	C	GRAPHICS	D+	VALUE FOR MONEY	C

Hearts reproduces the classic card game, in which the object is to avoid winning any tricks containing either a heart or the Queen of Spades. Like Whist, a player must follow suit to the lead card, but may discard any card if out of that suit. The player with the highest card in the lead suit wins the trick. Thus, the strategy is to discard hearts on your opponents while taking care that no one player accumulates all 26 points ("shooting the moon").

This is a three-player version (in which you are pitted against two computer players). It allows you to pass three unwanted cards to one of your opponents, but it does not allow the most popular option of "shooting the moon." This is very unfortunate, because the "Jekyll and Hyde" approach to accumulating points is what makes the game interesting. The cards are displayed in a text format rather than in a card form design. In sum, the computer plays a fair, but dull, game of straightforward *Hearts*.

ROULETTE

Company: Softape
Language: Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	N/A	DOCUMENTATION	B–
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	D
GAME DEPTH	C–	GRAPHICS	B–	VALUE FOR MONEY	C–

This Hi-Res graphics game can be played against the computer or with another player. It generates an attractive screen layout and requires the use of a light pen or keyboard. Bets up to $9 can be made on one to eighteen numbers. The author provides a table explaining the number of locations, numbers covered, and odds. With two players, the game is interesting and enjoyable.

SOLITAIRE

Company: Computek
Language: Applesoft/Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	A	ERROR HANDLING	A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	A	VALUE FOR MONEY	A

SOLITAIRE provides four versions of Hi-Res solitaire card games, including two not previously seen by this reviewer. The most popular game, "Klondike," is presented with two variants; the multiple pass consisting of rolling three cards off the pile with as many passes through the pile as desired or until the pile is depleted, and the single-pass, in which one card at a time is removed as favored by the gamblers. The two other games included are "Picture Frame" and "Pyramid." In the former, the object is to place all picture cards into specified locations in the "frame"; in the latter, the object is to remove all cards from the "pyramid." The rules for each game are summarized in the sparse but adequate documentation.

All Hi-Res playing fields are neatly laid out, and while some color is displayed, the game plays more easily using a B&W display which better emphasizes the contrast between the red and black suits. The square card representations are reasonable in size, but are not overly artful in design. The games are fun to play, and respond quickly to the easily learned single-key commands; so easily in fact, that a degree of playing addiction can result.

SHOOT-'EM-UP ARCADE GAMES

BILL BUDGE'S SPACE ALBUM

Company: Calif. Pacific Computer
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	B	GRAPHICS	B+	VALUE FOR MONEY	B–

This is Bill Budge's second game package. It uses the same 3-D graphics techniques for animation that he later offered in his 3-D animation package. His graphic techniques in Death Star and Tailgunner set a new standard in programming. The games themselves, which are mostly copies of arcade games, are more creative and challenging than his first package. The package contains four space games:

(1) ASTEROID – Four levels of play; the object is to shoot asteroids apart before they crash into you. The ship is much too large and stationary.

(2) DEATH STAR – This game will be familiar to anyone who saw the movie "Star Wars." You must guide your fighter through a 3-D simulation of the Death Star's defenses. Moving ships attack from above and lasers fire inside the canyon. Armed only with a laser, one must reach the gun port to blow up the star. An outstanding simulation.

(3) TAILGUNNER – 3-D like graphics, one player; you must shoot down opposing ships that bob and weave past your gunsight.

(4) SOLAR SHOOTOUT – Two player game; your ships maneuver and fire at each other as they orbit around a star.

CYBER STRIKE

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	B+	VALUE FOR MONEY	D+

CYBER STRIKE is supposed to be the Apple equivalent to Atari's "Star Raiders". While one wouldn't expect the same quality of speed or sound, since Atari uses two microprocessors and a four voice sound system, one would expect a more facile game with respect to ease of play.

The game has excellent Hi-Res graphics, both on the display maps and during battle sequences. The 3-D effect of ships attacking is excellent and fast. CYBER STRIKE chooses keyboard control over paddles because the game would need a joystick during the battle sequences, which would limit the market. The keyboard control (coupled with a lack of rangefinder and ships that appear too quickly and pass beyond your strike zone before your torpedos have a chance to reach their strike zone) make the game very difficult to play and frustrating for the beginner.

The game is basically one where enemy ships in different quadrants of the galaxy must be destroyed. One travels through hyperspace to these distant quadrants, then engages them in attack after first finding them with short range sensors. A limited number of photon torpedos are available and there is a starbase for re-energizing and re-arming. The docking with the starbase is done quite well.

In short, the game is conceptually good, with superb graphics; however, a few enhancements for improving playing capabilities could have been added to make it a more playable game.

BLISTER BALL & MAD BOMBER

Company: Creative Computing
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C

BLISTER BALL is an original arcade-type game that hasn't yet made it to the arcades. The object is to shoot down a bouncing bomb, that progressively bounces lower with each succeeding bounce before it hits your movable laser base. To add to the difficulty, the walls begin to narrow after a while until one has no choice but to zap the bomb or get hit. Zap the first bomb, then two appear, then three, four and five. This is followed by five blister balls that don't bounce, but are worth ten times as many points. Get under one and you have one shot. The game progresses to harder levels with faster balls that bounce lower. The game can be played with paddles and one or two players. The two player version allows team competition or cutthroat play. Overall, it is a uniquely original game that requires good eye-hand coordination and nerves of steel on upper levels. You'll have a ball unless the ball of your trigger finger gets blistered (which seems to be the theme of this game, anyway).

MAD BOMBER is a Hi-Res game where an enemy above you fills up ten bomb racks. When any one rack is filled with four bombs, it drops. The object is to move from side to side with your laser and zap the bombs either in the racks or as they fall. One must keep a pathway open to one side in order to occasionally rearm. One loses after ten bombs have hit the ground. This is meant as a one-or-two player game, in which you can either get bombed or racked up (which seems to be in keeping with the theme of this game, while we're on the subject of themes. But, then again, who asked?....).

PEGASUS II

Company: On-Line Systems
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B–	DOCUMENTATION	C+
CREATIVITY	B	CHALLENGE	C+	HOLDS INTEREST	B+
GAME DEPTH	B+	GRAPHICS	B+	VALUE FOR MONEY	B+

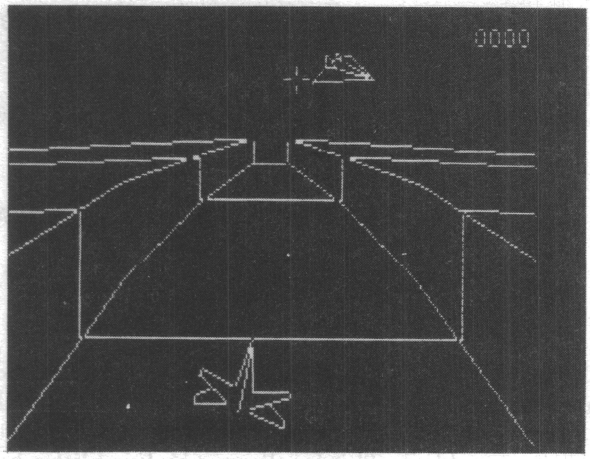
PEGASUS II is the Apple version of the arcade game Scramble. It incorporates some of the smoothest and fastest Hi-Res horizontal scrolling to date. The object of PEGASUS II is to attack an enemy's ground targets and defense installations located on the landscape below your flying ship. The player is armed with laser cannon and bombs and has a limited fuel supply. As you fly over the enemy terrain, the enemy launches rockets at your ship. Flying dragons block your path to your refueling base, and birds and flying saucers attack in waves when you get further into their defense zone. There is even the inevitable tunnel defended by tunnel killers, but that is so far into the game that beginners won't see it for some time.

Controllability is of prime importance in a game as fast as this. Our test-case players have had mixed reactions. Initially, the game gives you a choice between joystick and paddle. The joystick mode (self-centering recommended) is definitely easier for maneuvering the ship up and down plus back and forth along the left side of the screen. However, activating the A and S keys for shooting and dropping bombs while holding a sensitive joystick with the other hand requires the dexterity of the renowned one-armed paper hanger. Firing has to be so rapid that one wonders if the keyboard will survive the pounding. Some players resorted to having their friend do the shooting while they manuevered the ship. A better solution would have them use the joystick buttons. On the other hand, it seemed easier for one person to use the paddle mode.

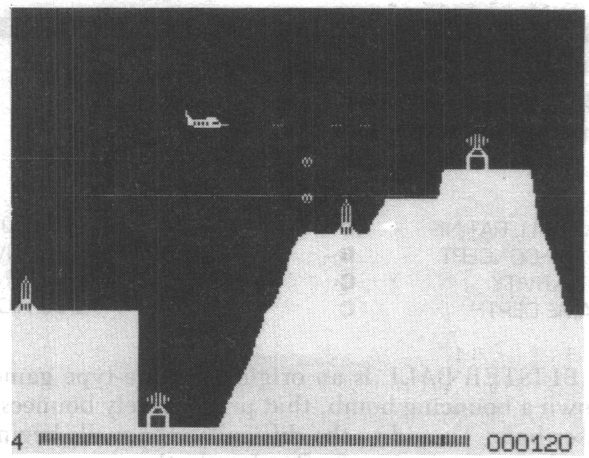
The control change incorporates the space bar for toggling the ship to move forward and backward; hitting it again will stop movement. The paddle, which is very sensitive and uses only part of the range, is better for maneuvering through the asteroid field. One fault of the control system is that if your paddle is turned too far in the direction pertaining to the ground, one crashes repeatedly into the terrain before the ship is moved upwards again.

The program is novel in that it allows you to generate your own landscape. Twenty-one frames can be created using a paddle. They are assembled at random when the game begins. Defense facilities require that at least one third of the terrain be level.

The game graphics are superb. The scenario is one of the longest of any arcade type game we've seen. The contest is somewhat difficult to control but definitely an addicting and worthwhile game.



BILL BUDGE'S SPACE ALBUM



PEGASUS II

STAR BLASTER

Company: Piccadilly
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C+**
CREATIVITY	**C**	CHALLENGE	**C+**	VALUE FOR MONEY	**C**
GAME DEPTH	**B**	GRAPHICS	**C+**	HOLDS INTEREST?	**C**

Star Blaster is a seven level shoot-'em-up game whose concept and final stage is somewhat reminiscent of the arcade game *Gorf*. Your ship is essentially flying towards the left and paddle controlled in its up and down movement. Various enemy craft hurl towards you, a few shoot back. Sometimes the ground terrain approaches and scrolls towards the left, heightening the illusion of foward motion. At one point you must chisel through a wall protected by miniature aliens in order to escape. And there is a snaking tunnel where objects within the tunnel try to ram your ship. The finale is an attack against the Dragonian mother ship which hides behind a barrier shield while firing at you. The screen goes wild in color if you are successful.

The game has an unusual demo mode that allows you to play the game without getting your ship destroyed by enemy fire or collision. Thus, you can play levels of the game that you may not have ever reached without extensive practice. The game itself is average yet somewhat fun to play. It offers a little more variety than many of these type games.

KAMIKAZE

Company: Hayden
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**D**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C–**
CREATIVITY	**D**	CHALLENGE	**C**	VALUE FOR MONEY	**D**
GAME DEPTH	**D**	GRAPHICS	**C–**	HOLDS INTEREST?	**D**

Defending your paddle controlled ship against innumerable enemy aircraft is the object of *Kamikaze*. Low level bombers flying to the right and high level bombers flying to the left constantly drop bombs on each of your five ships. It is almost like a game of shooting gallery except you must watch out for falling bombs. The skill in destroying the bombers is only a matter of timing. Your gun can't be aimed but it does shoot slightly ahead while moving forward, and slightly aft while moving backwards. While the game does appear to be simplistic, it becomes more challenging when mines begin crowding the water, and an occasional kamikaze pilot tries to sink your ship.

Overall the game's graphics are unsophisticated yet adequate. However, the game scenerio has very little depth, and tends to become boring rather quickly. The challenge is only in avoiding the intense bombardment, not in demolishing the planes.

PULSAR II

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	D+	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C–	SKILL INVOLVED	D+	DOCUMENTATION	C
CREATIVITY	D+	CHALLENGE	C+	HOLDS INTEREST	D
GAME DEPTH	C	GRAPHICS	D	VALUE FOR MONEY	D+

PULSAR II is a two-game combination, PULSAR and WORMWALL. PULSAR is a take off of the popular arcade game, Star Castle. A pulsar starship is protected by three deep-level rotating shields. Your ship's laser can blast apart a small section; however, when it does, an energy bubble is released that is attracted toward your ship. The object is to maneuver your ship to destroy these energy pods and blast a hole through the shields of the protected ship. However, once all parts of a ring are destroyed, it reforms and, of course, the pulsar shoots back through the gaps in its shield.

Nasir puts your ship into a circular orbit that is direction-controlled by the two arrow keys. Pressing space bar causes the lasers to fire, but you can't shoot twice without moving in between the ships because the energy bubbles are programmed to move straight outwards before orbiting. Nasir's choice of taking out the free floating maneuverability of the spaceship that was in the original arcade game has relegated this version to a bland shoot-'em-up game. While lacking the excitement of an arcade game, it does offer a challenge in its upper levels, since the energy bubbles, once in orbit, actively chase your ship. The game's Hi-Res graphics lack the detail of some of Nasir's better creations. The ship is represented crudely and blanks out in several places as it orbits the pulsar.

WORMWALL was offered to enhance the saleability of the package. There is a series of concentric corridors with moving gaps between them. Some openings exist permanently, others momentarily, as colored wall segments cross. Each corridor is protected by little monsters that try to catch and masticate you. The arrow keys control the direction and the one and two keys determine whether you jump inward or outward. The object is to reach the center. Eight levels of play.

GALAXY GATES

Company: Magnasoft
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

GALAXY GATES recreates the Star Castle arcade game for the Apple. The object is to attack an enemy starbase which is surrounded by rotating protective energy rings. The rings are three-layered; it takes several shots to disintegrate a section of them. However, if all parts of any one ring are destroyed, a new ring will reform. The base protects itself by launching deadly energy bolts programmed to home in on your ship. These can't be destroyed, but must be outmaneuvered by your space ship until they dissolve back into the energy rings from which they came. The ship in the center of the star base will also shoot back once the gaps in the three-layered rings appear.

Your spaceship is controlled by paddles. Paddle #0 turns the ship, with its button providing the ship's thrust. Paddle #1 fires missiles. It is somewhat awkward to hold both paddles in one hand, but it is preferable to a keyboard firing mode. The ship is very maneuverable, with an automatic slow down capability included as part of its steering flexibility.

The game becomes harder at each successive level; levels are attained by destroying enemy starbases. The energy bolts become more numerous after reaching a higher level and are more deadly (with their greater speed) in seeking out your ship. The Hi-Res graphics have to be considered only fair because of the difficulty in determining at times which end of the ship is up; however, this package guarantees a semi-gala galactic gallop through garrisoned and gauntleted gates of Ganymedian game-playing.

SUPER INVADERS

Company: Creative Software
Language: Assembly
Hardware Requirements: 24K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	**C+**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C–**
CREATIVITY	**C+**	CHALLENGE	**B**	HOLDS INTEREST	**B–**
GAME DEPTH	**C–**	GRAPHICS	**C**	VALUE FOR MONEY	**C+**

SUPER INVADERS is exactly the same game as the popular arcade game of the same name. It is a one-player, Hi-Res game where one has to shoot down an advancing horde of hideous space invaders that are continuously shooting back. The left and right motion of your gun turret base is controlled by the game paddles. One shoots with the paddle buttons. Although one can hide behind four castles (at least before the invaders shoot them to pieces) and avoid combat, the invaders must be completely destroyed before they land. You are given three gun turret bases. It is an addicting game.

STELLAR INVADERS

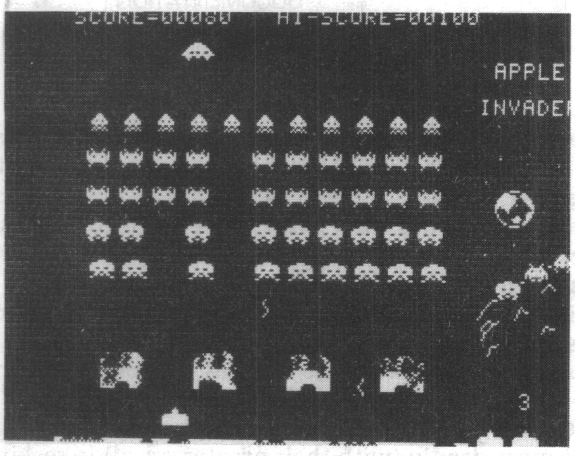
Company: Apple Computer Co.
Language: Pascal (runtime)
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $25.00
Availability: 9
Disk or Tape: Disk

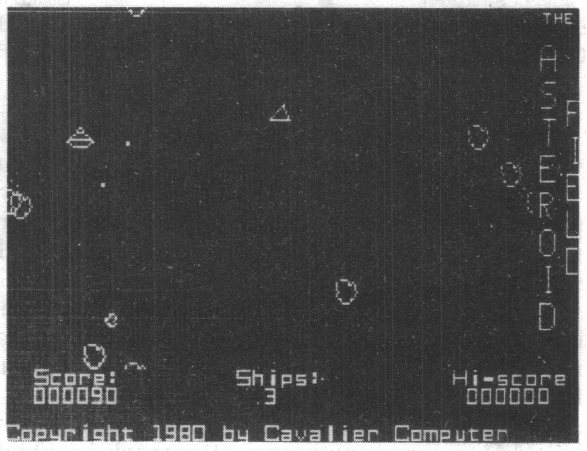
OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**B**	HOLDS INTEREST	**C+**
GAME DEPTH	**C–**	GRAPHICS	**C**	VALUE FOR MONEY	**C**

STELLAR INVADERS is Apple's version of the popular arcade game. The format of the game is similar to other versions available from Creative Software and Programma. This version employs a more varied set of graphic characters to shoot down as well as increased sound effects. Paddle response is, however, somewhat slower.

Although written in Pascal, STELLAR INVADERS will run on either an Apple II or an Apple II Plus with or without a Language Card.



SUPER INVADERS



THE ASTEROID FIELD

ASTEROID FIELD

Company: Cavalier Computer
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	**B+**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**B+**	DOCUMENTATION	**B–**
CREATIVITY	**B**	CHALLENGE	**B+**	HOLDS INTEREST	**B**
GAME DEPTH	**C+**	GRAPHICS	**B**	VALUE FOR MONEY	**A**

The proliferation of Asteroid games over the last year has always left the Apple owner with that nagging question, "Why can't someone write a version 'exactly' like the arcade version?" Your wish has been granted with Asteroid Field. This version is a faithful rendition of the game given the constraints of the Apple's keyboard and paddle controls. For those that are new to the Apple or arcades, Asteroids is an addicting game where one navigates a space ship through a field of moving asteroids. The object is to score points by shooting these asteroids apart and destroy them. Of course, pieces of asteroids make the game more perilous and, in addition, there are two sizes of alien spacecraft that randomly enter the field in an attempt to destroy your ship.

The game offers the player an option of using either keyboard control, paddle controls, or a combination of both. While the keyboard input (using "D" and "F" keys for rotation, the right and left arrows for thrust and firing, and the space bar for hyper-space) is the closest device for approximating the feel of the arcade, the keyboard does not respond quickly for fast-turning without using the repeat key. The easier method of control is paddles. One can control the turning and firing with one paddle while using the button provided with the other for thrusting. [Another option uses only one paddle for steering, shooting and thrusting. The button, when pushed rapidly, fires, but when held down longer, thrusts.] The thrusting in ASTEROID FIELD, unlike others, is controllable. Subtle maneuvers can be performed because there is an automatic slowdown. One doesn't need to worry about retrothrusting.

The sound effects are extensive and one knows instantly when an alien ship appears. The scoring system is the same as the arcade; more points for hitting pieces of asteroids, 200 points for large ship, 1,000 points for small ship and an extra ship rewarded at 10,000 points. There is also an expert mode with only three ships provided instead of five, faster asteroids and more aliens. Definitely the best asteroid game and reasonably priced.

METEOROIDS IN SPACE

Company: Quality Software
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B–**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**B**	DOCUMENTATION	**B–**
CREATIVITY	**B**	CHALLENGE	**B**	HOLDS INTEREST	**B–**
GAME DEPTH	**C+**	GRAPHICS	**B–**	VALUE FOR MONEY	**B+**

METEOROIDS IN SPACE is a Hi-Res, fast-action arcade game in which one steers his spaceship through a field of moving asteroids. The objective is to clear the asteroid field with your ship's guns while scoring as many points as possible. Trouble is, the asteroids split asunder when hit, resulting in the field becoming dangerously crowded with smaller rocks. Your spaceship is steered and thrust is provided by one paddle. Besides being free-floating, it also possesses an option not included in the previous version: automatic deceleration. In the old version of ASTEROIDS in space, one had to turn and reverse thrust to slow down. Inevitably, rapid acceleration caused the spaceship to crash. There is also an option for auto-firing. This was included because the firing key (space bar) is awkwardly placed on the keyboard. However, we did find that paddle button #1 shoots the gun. The game has a hyperspace mode and a large, crudely-designed ship that fires at your spaceship. One has to watch carefully for the attack, since there is no sonic warning. The game *is* challenging. With its improvements, it comes closer in appearance to the arcade version. We would rank it second in a field of six similar games in this competitive area.

COSMIC COLLISION

Magnasoft $19.95

COSMIC COLLISION offers some nice improvements in the field of graphics games. Tumbling and/or spinning asteroids with a background star field are nicely-implemented. However, the stars make it difficult to determine where your shots are going. The ship, which is controlled by a paddle, maneuvers like a car. It isn't free floating and consequently stops abruptly. Firing is implemented on the keyboard. Enemy ships attack more frequently than normal as they commence shooting laser beams. One battles the ships at least one-third of the game. Overall, the game needs a better control system.

APPLE-OIDS

California Pacific Co. $29.95

APPLE-OIDS uses apple-shaped asteroids in this version of the game. The ship is free-floating, with automatic deceleration and is paddle-controlled. It solves the problem of controlling movement at the end of the paddle range by allowing the ship to continue rotating. Included in this game are two enemy ships of differing sizes and hyperspace capability. The disk also comes with a Hi-Res version of BREAKOUT, called CHIPOUT.

PLANETOIDS

Adventure International $19.95

PLANETOIDS incorporates a free-floating, paddle-controlled ships. Firing is done on the keyboard and ships of two differing sizes attack periodically. The game's sound and graphics are crudely implemented. The game has an advanced option in which the asteroids are attracted to your ship. A restriction in this version is that when your next ship appears and any asteroid is in proximity to it, you can't get a shot off before you collide.

ASTERON

Western Micro D $29.95

ASTERON is the Canadian version of aesteroid games. It utilizes a paddle-controlled, free floating ship. A single enemy ship with hyperspace capability uses the space bar to fire. The graphics are good, but it lacks the fine feel of the arcade game.

	Asteroid Shape	Enemy Ship Types	Controls				Ship Movement	Graphics Quality	Play-ability	Price
			Steering	Thrust	Fire	Hyperspace				
Asteroid Field	Rocks	Small & Large	Paddle #0	Button #1	Button #0	Space Bar	Free Floating Auto Slow Down	V. Good	Excellent	$24.95
Meteoroids in Space	Rocks	Large	Paddle #0	Button #0	Automatic or Space Bar	Asterisk Key	Free Floating Auto Slow Down On or Off	Good	V. Good	$19.95
Appleoids	Apples	Small & Large	Paddle #1	Button #1	Number Keys	Non-Number Key	Free Floating Auto Slow Down	V. Good	V. Good	$29.95
Cosmic Collision	Spinning Rocks	Two Large Types	Paddle #0	Button #0	Keys	0 Key	Moves Like Car Stops Abruptly	Good	Good	$19.95
Asteron	Rocks	Large	Paddle #0	Button #0	Space Bar	Number Keys	Free Floating	Good	Good-V. Good	$29.95
Planetoids	Rocks	Small & Large	Paddle #0	Button #0	Keys	Return Key	Free Floating Auto Slow Down	Fair	Good	$19.95

NOTES: (1) ASTEROID FIELD includes alternative control modes. Autothrust mode — Button #0 when pressed rapidly fires, but when held down, thrusts. Also uses keyboard mode.

(2) METEOROIDS IN SPACE also has keyboard mode. Auto fire and auto slow down can be disengaged. Button #1 (firing) is undocumented.

PHOTAR

Company: Softape
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**D+**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**D**	DOCUMENTATION	**C**
CREATIVITY	**D+**	CHALLENGE	**C–**	HOLDS INTEREST	**D**
GAME DEPTH	**D**	GRAPHICS	**C–**	VALUE FOR MONEY	**D**

Photar is a space shoot-'em-up game that bears a strong resemblance in game design, but not in character design, to the arcade version, *Centipedes*. The player has a joystick-controlled ship that can be maneuvered around the bottom of the screen while firing at the various screen targets. One target doggedly hounds his every move. A group of six spinning stars, starting at the top, work their way slowly to the bottom through a maze of diamond targets. Unlike *Centipedes*, these stars aren't chained together, but break triangular formation immediately, seeking their own path towards you. Another target periodically places more diamond targets on the playfield as it launches a kamikaze attack against your ship. Included also is a bonus target that scurries quickly across the screen, shielded by numerous diamond targets.

The game's playfield is vertical, thus using only half of the screen. The graphics are, unfortunately, somewhat mediocre. Although the game is quite playable, it only offers one ship per game instead of the usual multi-ship variety. The contest ends just when you are beginning to get involved. It's too bad Softape changed the game's concept and modified the fine dynamics of the original version, in which they used some neat insects like spiders and nightcrawlers to really bug you.

NIGHTMARE ALLEY

Company: Synergistics Software
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**D+**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**D**	DOCUMENTATION	**C**
CREATIVITY	**C–**	CHALLENGE	**C**	VALUE FOR MONEY	**D+**
GAME DEPTH	**D**	GRAPHICS	**C**	HOLDS INTEREST?	**D+**

Nightmare Alley bears a strong conceptual similarity to the arcade game *Centipedes*, but the cast of characters are ghoulish instead. You are armed with a paddle controlled gun that shoots silver bullets. Werewolves, vampire bats, ghouls, ghosts, and mummies work their way towards you as they wander through a cemetery full of tombstones. Most of these nightmare creatures can be killed, but the ghosts and the mummies are already dead, so beware. If a monster reaches you, he will destroy your revolver, but fortunately you are equipped with a limited number of shields that ward off their attacks. Sometimes an extra shield is awarded for shooting a ghost. You begin with three guns, and you are awarded an extra at 10,000, 20,000 and 50,000 points.

The game is extremely easy for the first 30,000 points. It is simple to gain an extra two guns without a casualty. But sooner or later, after the cemetery fills up and the number of creatures increases, it becomes apparent that you can't shoot out the cemetery stones and creatures as fast as they appear. Eventually you resort to warding off the attackers with your last few shields. The unearthly scream that occurs when your revolver is destroyed may startle you. All in all, it is a mediocre game.

BUG ATTACK

Company: Cavalier
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B–
CREATIVITY	B	CHALLENGE	C+	HOLDS INTEREST	C
GAME DEPTH	C+	GRAPHICS	C+	VALUE FOR MONEY	C+

BUG ATTACK takes one to the whimsical world of garden bugs in this Hi-Res arcade shoot-'em-up game. The object of the battle is to defend your garden of mushrooms, clover and flowers against vicious ants, killer millipedes, and destructive Medfiles. Your paddle-controlled spider can launch deadly stingers at the enemy insects, while they attack with daggers as they descend in insect-like fashion down the top of the screen. As one advances to harder levels, one must defeat the Master Millipede and the Queen of the Medflies.

The animation is cute. The millipedes wind their way through the garden like caterpillars and the Medflies bounce around like flies (possibly because that is what they are). There is also a cartoon between levels that would amuse children for which the game is obviously intended. Sound is also an integral part of the game. The ants enter the screen to the tune of "When The Saints Go Marching In", which in certain children's circles is known as the "When The Ants Come Marching In". Each insect has its own sounds.

The graphics are smooth and the game is well-implemented. Playing difficulty is not a prime factor at the mushroom garden level, but one will have a nearly impossible time killing the Queen of the Medflies at the end. A good game, but one that can really bug you.

STAR THIEF

Company: Cavalier Computer
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

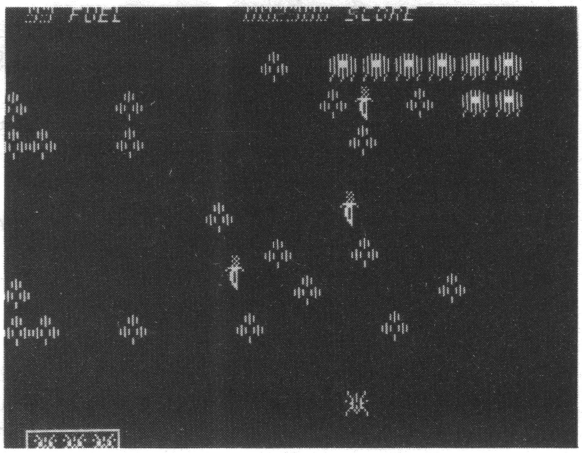
OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	B+
GAME DEPTH	B–	GRAPHICS	C	VALUE FOR MONEY	B

In STAR THIEF the object is to guard a depot containing eight powerpods from attacking alien thieves. In this fast action arcade game for one or two players, these aliens enter the depot with their guns blazing. They split up, one attacking you while the other attempts to carry off a powerpod, or they both attack, hoping to kill your ship and during the two second interval before your ship reappears, get a head start stealing the pod for a breather an occasional enemy gobbler appears, but it must be killed before it eats your powerpads.

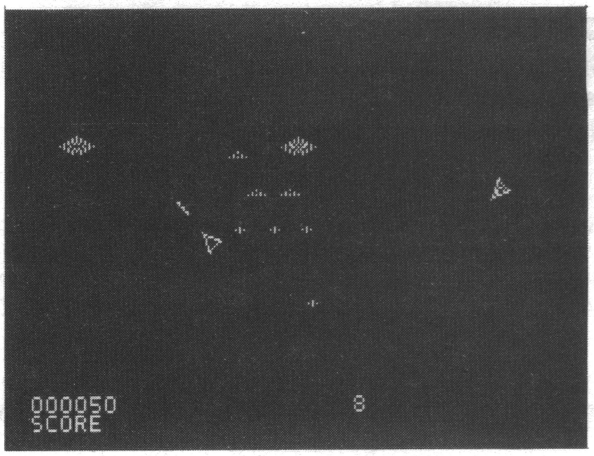
The game is very playable and easily controlled using one paddle. The ship can be steered with the paddle and thrusted with its button held down, as in an asteroid game. The ship will automatically slow down and it can't leave the depot or fly off the screen in a wraparound effect. Pressing the paddle button rapidly activates the guns. This control system works well and only takes a few minutes to get used to. Although there are other ways to do it, it was the easiest method to allow two players separate control.

STAR THIEF is best played with two players against the computer's thieves. As a two player game it requires cooperation and strategy to defend against a simultaneous attack of three aliens. As in the original arcade game RIPOFF the game is much easier to play and lasts longer with team play.

The graphics, which are in color, are uncluttered and not very exciting. However it is an excellent fast action arcade game that gets faster and more diffcult as you accumulate points. It is a game that grows on you as you get more sklled, and it is one of the few games that friends can play as a team for hours.



BUG ATTACK



STAR THIEF

SPACE EGGS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C**	DOCUMENTATION	**B**
CREATIVITY	**C+**	CHALLENGE	**B–**	HOLDS INTEREST	**B–**
GAME DEPTH	**B–**	GRAPHICS	**B**	VALUE FOR MONEY	**B**

SPACE EGGS is a variation of the Star Cruiser-Galaxian genre. In this colorful version, your three-stage spaceship attacks a group of swirling space eggs. Once an egg is broken, depending on which level you have attained, either a spider, lip, wolf, or fuzzball attacks your ship. You have to kill these monsters with your guns as they dodge, swirl and weave. The top stage of your rocket has one gun, the second stage, two guns, and the booster two widely spaced guns. Each time you lose a stage of your ship, you start again at the lowest level. When you reach 1,000 points, you can dock with a lower stage for a three-gun attack. The upper-level monsters prefer a fast kamakaze attack. The game is cute and challenging; those that like the Galaxian-invaders concept will enjoy this version.

FLOCKLAND ISLANDS CRISIS

Company: Vital Informations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 1
Disk or Tape: Disk

OVERALL RATING	**F**	CONTROLABILITY	**D**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D–**	SKILL INVOLVED	**D+**	DOCUMENTATION	**C–**
CREATIVITY	**D–**	CHALLENGE	**D+**	VALUE FOR MONEY	**F**
GAME DEPTH	**D**	GRAPHICS	**D**	HOLDS INTEREST?	**F**

Flockland Island Crisis is a keyboard controlled shoot-'em-up game where the object is to defend the island from ships attempting to remove the island's "valuable" soil. You control two separate but movable gunnery bases located on either side of a narrow vertical band which represents your island. As ships slowly approach, you position the gun bases with the Q/S and P/L keys so that they line up with the enemy. The space bar fires. Once five shiploads of dirt are removed (you can't shoot departing ships) the game ends.

The game is horrible. The controls are awkward for a single player, the graphics are poor, and the game should hold one's interest for not more than a few minutes. This is the quality of game that used to appear on public domain club disks, and is definitely not worth buying.

CROSSFIRE

Company: On-Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	D+	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	B+	HOLDS INTEREST	B+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B

CROSSFIRE, a shoot-'em-up contest in which you defend a city's streets from attacking aliens, has its roots in the arcade game, "Targ". But where "Targ" allowed you to shoot only in the direction towards which you traveled, CROSSFIRE has expanded the possibilities, resulting in a much more complex game. However, the ability to travel and shoot simultaneously in different directions requires a keyboard-controlled game. This makes for a contest that is difficult to play, requiring considerable practice. A pianist might be more suitable as a participant in the exercise involving control-key arrangements (pyramidally-arranged E,S,D,F keys for firing, I,J,K,L for moving, and the space bar for stopping).

You patrol the block-like, grid-oriented streets of a city surrounded by alien creatures. Your guns contain 35 missiles. As you play cat-and-mouse with their advancing forces, you move into an intersection and fire. If you hit one, it metamorphoses into another creature worth more points. Occasionally, a bonus shape appears on one of the central streets. If you can reach it before firing six more rounds, it is worth points; otherwise, it disappears. When your ammunition runs low, a fuel depot appears somewhere in the city. At that, it isn't easy to reach, with more than a dozen laser armed creatures gunning for you.

CROSSFIRE is a very challenging game with effective, fluid graphics; however, it unfortunately suffers from what most will consider an impossible control system. Playing a game like CROSSFIRE requires the player to have excellent multifinger-eye coordination. A minimum of at least half an hour's practice will normally be required in order to score more than a few hundred points. Those lacking a modicum of patience will probably move on to another game which is more fun and easier to play before even giving this game a chance.

THRESHOLD

Company: On-Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 9
Disk or Tape: Disk*

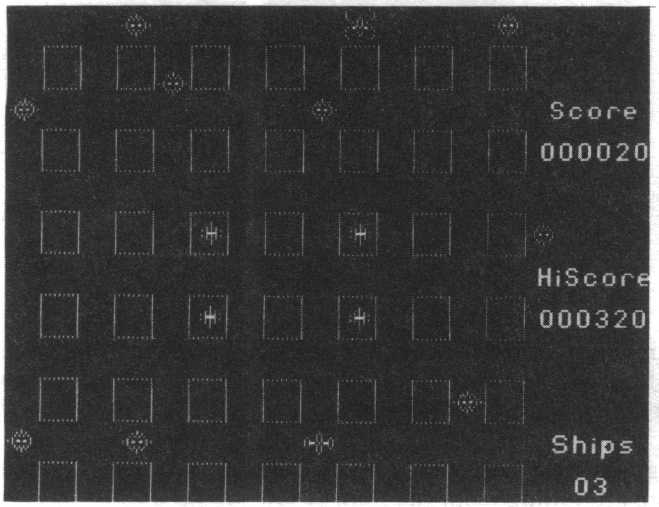
OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B+	GRAPHICS	B+	VALUE FOR MONEY	C+

THRESHOLD closely resembles the arcade game, "Astro Blaster". The object is to destroy waves of attacking aliens with a paddle controlled space ship. It's the usual scenario, with this exception: the game offers substantial depth and variety. There are 24 types of attackers. Some present easy targets while others consist of vicious kamikazes, which are very durable and elusive. Some fly in formation, while others bounce around the screen erratically. Each has a personality and shape of its own. There are flying fish, revolving spaceships that turn smoothly on their axes, maple tree helicopters and Volkswagen bugs.

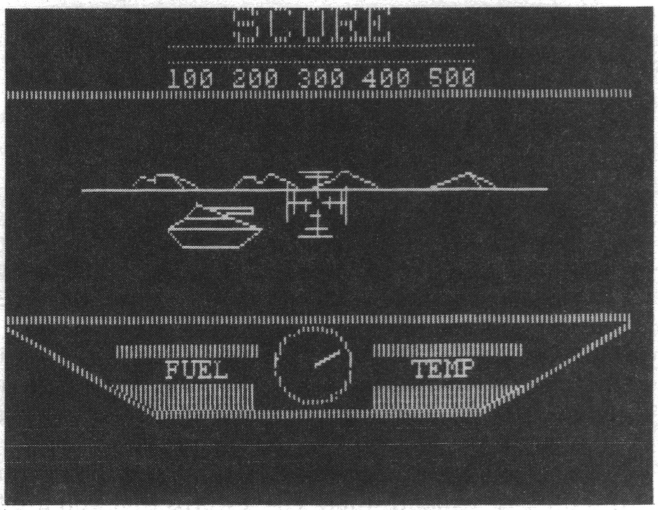
The player has five expendable ships that he can use for battle. Aiming and shooting is precise and effective, but one's gun may become overheated from rapid firing. If this occurs, one must bide his time dodging bullets while the guns cool.

The graphics animation is exceptionally smooth. Objects have no problem passing in front of each other. The only complaint is that the moving star field can be confused with the rain of alien bullets. The bullets on a color set appear as colored objects; but they should be made to appear more distinct to distinguish them from the star field, if not larger. However, there is an option to eliminate the star field for those using a B&W monitor.

The game will appeal to many dedicated space game fans. The contest has many levels, so that only a few players will reach the end; yet most, driven by curiosity, will make the attempt as the pseudo-addictive aspect takes hold.



CROSSFIRE



ROBOT TANK

ROBOT TANK

Company: Micro-Ware Distributing
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	**D**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C–**	SKILL INVOLVED	**D+**	DOCUMENTATION	**C–**
CREATIVITY	**D+**	CHALLENGE	**D**	HOLDS INTEREST	**D**
GAME DEPTH	**D**	GRAPHICS	**C+**	VALUE FOR MONEY	**D**

ROBOT TANK is a 3-D tank battle pitting the victim. . . er. . . player against the computer. At first glance it reminds one of the "Battlezone" arcade game with its tank and saucer-shaped enemies, plus a mountainous background viewed through your tank's windshield. However, the barriers are missing, and since it uses Bill Budge's 3-D graphics package, the battlefield isn't an actual 3-D database.

One can maneuver a tank from side to side as well as back and forth with a joystick. Moving forward too rapidly where you pass another tank doesn't place the other tank to your rear but instead produces a new tank in the same starting place. Likewise, turning towards a position where the tank goes off screen only gives you a brand new tank in the old position. The programmer has completely ignored the possibilities of an off-the-screen tank that could attack from the rear or from the side because of your inattention.

The computer tank is endowed with minimal intelligence. When it is located at a distance, it continually turns and fires. Fortunately, to your advantage, it can only hit you if it fires dead-center when it is in proximity to your gun sight. It then becomes a matter of who shoots first. When the tank is close, it progresses to the right so that you have to lead it with your gunsight. At all times, it never turns to fire. Although it looks big enough to hit when it is close, the destruction point is very narrow, exactly in line where the gun protrudes from the tank. It can take up to ten shots to annihilate a tank. When and if you succeed in doing so, the top of the tank blows off, catapulting upwards and outwards. Unusual effect.

The inevitable saucer traverses infrequently across the screen during normal play. Strangely, if you drive forward past three tanks, it will always land. It never shoots back, and it is nearly impossible to hit before it quickly exits. This reviewer may have hit it once, say, out of one hundred tries. I'm not really certain, however, since, although it sounded like I zapped it, nothing exciting or even noticeable occurred. It is also strange that sometimes a tank will blow up which isn't even near your gunsight. Kind of a freebie, I guess. A little philanthropy doesn't hurt in a game like this.

ROBOT TANK doesn't retain much of a challenge once you perceive what a real bozo-brain your computer opponent is. The program attempts to apply the novelty of 3-D effects to offset its lack of strategic play. The game has several annoying features such as a paddle-centering gimmick that has no applicable use, since it doesn't calibrate the range of the paddles. Another abrasive feature includes a game start that begins without a key press. When a new game starts, the enemy tank shoots immediately for a direct kill unless you have your steering banked to extreme hard right or left. Overall, the game is a nice idea with decent graphics but is designed poorly.

TWERPS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C+	CHALLENGE	B	VALUE FORNEY	C–
GAME DEPTH	C+	GRAPHICS	B	HOLDS INTEREST?	C–

The game *Twerps* sends you on a rescue mission to a barren asteroid to save the stranded *Twerps* creatures. In order to do this you must blast your way through a three-level wall of alien orbiters encircling the asteroid. The quest is not difficult except that your spaceship has a limited amount of fuel. The longer you take, the more likely you are to run out of fuel before returning to base.

Once you blast your way through the orbiters you must guide your ship to the landing base. Retrothrusting to a distant base expends fuel. The Twerps that you are to rescue are hiding from the hungry Gleepnoks and the flying Glingas, but your fellow creatures are easy to spot since their long antennas protrude above the craters. Rescuing one is easy: maneuver your captain by keyboard or joystick to the crater, then press the button or hit the space bar. Soon you'll have a line of thankful Twerps. If danger approaches run to the nearest empty crater, and hit the button to hide. The craters are linked by tunnel so you can always exit somewhere else. This uses up time and fuel. But although you can always fly off and leave several behind, you are docked 20 points for each, and awarded only 15 points for a successful rescue.

The graphics, which are professionally done, are cute and whimsical. The game is very difficult to win. Success in returning to base is nearly impossible because one always runs out of fuel. The game seems to adjust to your success at one stage by making the next stage harder. You'll always have a distant landing site if you manage to defeat the orbiters quickly. Unfortunately, *Twerps* doesn't have a lot of depth. Shooting your way through the orbiters is boring, but playing hide and seek on the asteroid during the rescue mission is fun. It's too bad that the asteroid portion of the mission isn't more involving because they might have had a really interesting game.

GORGON

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

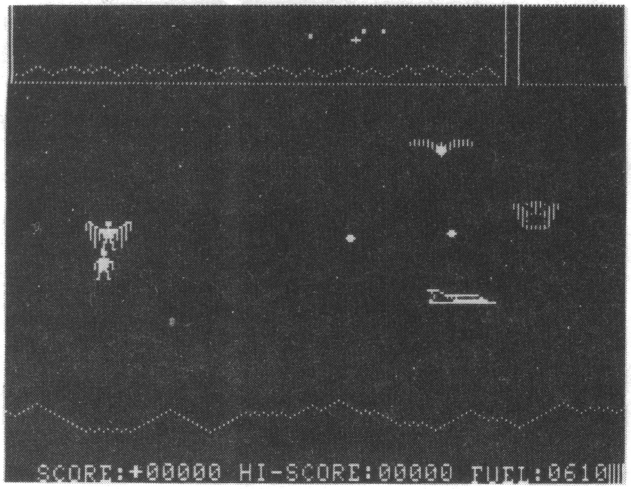
Department: Entertainment
Sugg. Retail: $39.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B	HOLDS INTEREST	C+
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	C+

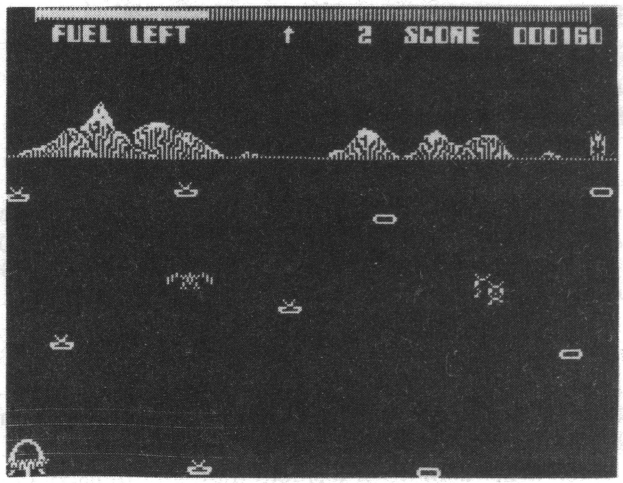
GORGON is Nasir's version of the arcade game, Defender. Armed with three laser armed ships, your assignment is to defend the Earth and it's last remaining humans from four breeds of villainous aliens that materialize in the sky. Although most of the creatures are bent on destroying your ship, one bird- like creature, a gorgon, swoops down to the ground to steal humans. With a series of nicely timed keyboard moves, one must kill the kidnapping bird, catch the falling person in midair, and deposit him safely on the ground.

Your ship is maneuvered over a scrolling battlefield with the two arrow keys for direction control. At the top of the screen, a sensor display, fed by orbiting satellites, shows the location of enemy invaders in relation to your ship. It is a useful tool, since one often flees from a screen full of monsters or from the floating mines that one creature releases, after which you need their location again for a future battle. The game is further complicated by the considerations of a limited fuel supply. Refueling is almost a game in itself as you maneuver your ship through twelve orbiting satellites to the mother ship.

GORGON lacks the high speed excitement of the original arcade game, but instead offers the challenge of winning in a more strategy oriented game. Control, which is entirely by keyboard and takes a lot of practice, would have been better on a joystick. The keyboard controls require pressing the arrow keys constantly to key the ship in motion. Nasir's graphics are superb. He has brought the monsters to life with flapping wings and bird-like sounds. The game will certainly offer players a challenge.



GORGON



TWERPS

PEEPING TOM

Company: Micro Lab
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	**D**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C–**
CREATIVITY	**D**	CHALLENGE	**C+**	VALUE FOR MONEY	**D**
GAME DEPTH	**D**	GRAPHICS	**C**	HOLDS INTEREST?	**D**

The trick to marketing the standard shoot-'em-up game where the alien attacks the lone ship is novelty. *Peeping Tom* tries the shuttered window approach. The screen is divided into four shuttered windows. Your paddle controlled ship is below the windows. You can't see the alien that is shooting at you, only the bullets. But if you hit one of them, one window opens to reveal other attackers. Different levels have different configurations. Level two divides the screen into six, skinny, vertical segments. The game is a little different from the rest, but I don't think it will hold your attention for more than a few plays.

BORG

Company: Sirius Software
Language: Machine Language
Hardware Requirements: 48K Apple II or II+

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C–**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C–**	SKILL INVOLVED	**C**	DOCUMENTATION	**C+**
CREATIVITY	**D+**	CHALLENGE	**C+**	VALUE FOR MONEY	**D+**
GAME DEPTH	**C+**	GRAPHICS	**C+**	HOLDS INTEREST?	**C–**

Killing dragons in the evil Grud's ten maze-filled castle rooms while searching for the Grud himself is what the game *Borg* is all about. Success in the mission is a formidable task, since each maze has its own peculiarities and is inhabited by dragons. At first the dragons are easy to kill, but on upper levels they shoot back. However, these dragons also have a friend named "Borg." When they begin losing, they call to him out loud. Borg hops in like a stupid looking giant kangaroo and chases you to the next maze. He can stomp through electrified barriers, and he can't be killed. He hops faster than you, so you must learn the fastest way through the maze without touching the walls if you plan to survive long. Each maze is different, and each requires learning which walls can be walked through and which are electrified.

Borg can be played by keyboard or joystick controls. The game's graphics are amusing, though a little crude. The mazes are probably of chief interest in the game, but the ease of the first two room mazes combined with the frustration of dealing with *Borg* causes most people to lose interest. The game at times appears silly. With the large selection of games on the market, most people will just pass this one by.

BEZ WARS

Company: Bez
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $26.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C–	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C–
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	C–
GAME DEPTH	C	GRAPHICS	C–	VALUE FOR MONEY	C–

Bez Wars is a chaotic two-player war arcade game. Imagine two *Space Invaders* armies squared off against each other, each army reinforced by a player-controlled mobile rocket launcher. Each army attacks the other with the object of destroying the opponent's rocket launcher.

Each army is more of a shield than an offensive partner in the assault. An occasional flying saucer, which crosses the center of the screen, tends to keep the two advancing armies separated. It is also worth bonus points if you can dissimilate the saucer into a pyrotechnic panorama (i.e., zap it).

Your rocket launcher is capable of firing such a barrage of missiles at your opponent that you seriously wonder if more than minimal skill is involved in the game. There are so many laser-like zappers flying that you are not surprised when they are destroyed, only relieved. Laser collision detection is imprecise, as it often appears that your opponent is hit although nothing happens.

The game's graphics are mediocre B&W; it's fairly obvious that this compiled game uses the DOS tool kit's character generator graphics for animation. The game itself is not exactly hyper-challenging; however, it does offer a quick release of id-driven aggression if you desire a free-for-all, shoot-'em-up extravaganza pitting one human against another for point totals.

MINOTAUR

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk

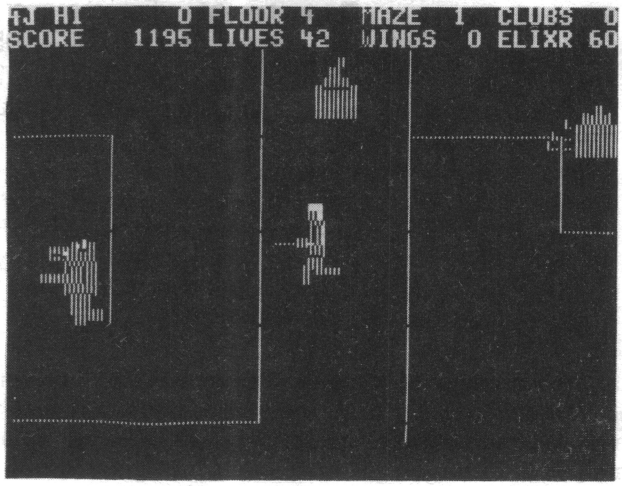
OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B+	VALUE FOR MONEY	B
GAME DEPTH	B	GRAPHICS	B+	HOLDS INTEREST?	B

This arcade-style maze game is rooted in mythology. King Minos built a maze on the island of Crete to contain the Minotaur, the ferocious offspring of his wife and a bull. The maze also contains numerous creatures, fiends who do the evil biding of the Centaurs and Minotaur. Playing Theseus, son of Aegeus, chief hero of Attica and one of the Argonaunts, you are sent into the four level maze to slay the Minotaur with your laser sword.

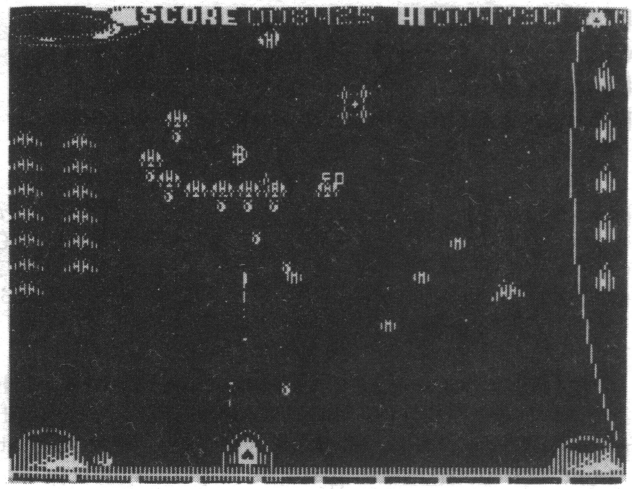
The maze levels are interconnected by stairways, but the corridors are guarded by ferocious hall creatures, scouts from the Minotaur. They include Furies, Charon, and Skeletons, and they can reappear once you kill them. On the other hand, room creatures are confined to one area and disappear when killed. These monsters include Centaurs, dragons, spiders, snakes, cyclops, and Momus. Depending on the strength of the creature, they can inflict serious damage, taking away several of your 99 lives.

Of course it isn't quite a one-sided battle. Various items can help in your quest. Skulls and virgins give you more lives, clubs help you smash through walls, and wings give you the power to fly so that you can see greater portions of the maze than from the ground. There is also an elixir that allows you to wander through walls, free of your body. But beware! Charon is the one creature who can kill you in your spirit form.

The game is best played with a joystick, although keyboard and paddle modes are available. The game is involved and keeps you interested for some time. The game is like a real time puzzle, yet it makes a fast shoot-'em-up game. The graphics are very good and novel in the way the maze has a variable shrink factor when one is flying. Normally only about one twentieth of the maze is visible at any one time. When flying much more of the maze becomes visible until (if high enough), the entire maze is visible. Since the game isn't difficult to beat, killing the Minotaur leads you to a different maze. There are 32 different mazes, more than enough to gain a very high score and a long, pleasurable afternoon.



MINOTAUR



BANDITS

BANDITS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**B+**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B+**	DOCUMENTATION	**B**
CREATIVITY	**B–**	CHALLENGE	**B+**	VALUE FOR MONEY	**B**
GAME DEPTH	**B**	GRAPHICS	**B+**	HOLDS INTEREST?	**B**

Bandits is an innovative variation of the familiar Galaxian game, at least in the beginning. You have a ship, one of five that is paddle maneuverable at the bottom of the screen. Each ship has a limited amount of replenishable shield energy. Shield energy is effective in units of time. Pressing the space bar twice activates the shield for two time periods. The remaining shield energy is shown at the bottom of the display.

In the first two levels, formations of Phalanxes attack singly or in groups of twos, threes and fives. In themselves they are easy to beat, if you avoid their heat seeking missiles. However, if they get past you, they steal your supplies of food or equipment which you are guarding. There is yet another chance to save the purloined supplies if you shoot accurately as they attempt to escape to base.

When you reach level three, these easy-to-beat Phalanxes are accompanied by deadly Menaces. While the Menaces don't steal your supplies, they preoccupy you, and their missiles are even more deadly; but there is no use in killing the last of these reappearing creatures until all of the Phalanxes are dead.

The next level is a little tricky. This fourth level is a confrontation with the not so friendly Carriers. They look like colorful jacks from a jacks and ball set. The problem is that when one is hit, it breaks up into four bouncing Nusiants. This is when using shields becomes necessary. If you manage to defeat these guys, then comes the snake-like Torrents, who attack in centipede fashion. You must kill every last part or they repeat their napalm assault.

Bandits sounds simple except there are 28 levels. All the rest of the levels are combinations of attacking creatures. The game becomes hectic when you are simultaneously confronted with seven Phalanxes, two Menaces, one Carrier, and snake of Torrents. That's just level six, so level 28 must really be a wonder to behold, and a surefire challenge to the local arcade champion.

The game is either paddle or keyboard controlled. However, it is moderately difficult to handle a paddle with two hands while pressing the space bar to activate shields. So many players resort to two player team play to control the game satisfactorily since the game requires fast reflexes. It is too bad that the game can't be played on a joystick with two buttons to control fire and shields because two player control is not a good solution unless two minds are syncronizied. Overall *Bandits* is definitely fast, fun, and a challenge to play.

FALCONS

Company: Piccadilly Software
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	A	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	B

FALCONS is a remarkable and faithful version of the popular arcade game, Phoenix. The game has five levels of depth. It begins like any Galaxian game: formations of aliens peel off and attack (except these birds visually fly back up). In level two, they combine into a different formation with more cunning attack strategy. Levels three and four present you with rotating spiral targets which grow from small dots to large eggs that hatch into giant deadly Phoenix birds. Defeat these birds and you get to attack the giant mother space ship. It is protected by swarms of attacking birds. Your object is to blast a hole through the hull into the central control room. Good luck; this game is a doozy!

One can use paddles, joystick or even an Apple III keyboard. You're given three paddle- or joystick-controlled ships that move across the bottom of the screen. One of the joystick buttons shoots, the other creates the shields. Shield use has its penalty. One can't move during its five second effectiveness and it can't be reused for the same time afterwards. The problem is that these enemy birds are "intelligent". They seem to know when you are most vulnerable, like when your shields drop off. The birds drop below the bottom of the screen and sometimes fly right into you from below. While this doesn't seem fair and is frustrating, it makes it even more challenging. Also the amount of maneuvering room under the space ship is much narrower than in the real game. The birds are always too close and give you little reaction time. The screen in the arcade is very long from top to bottom and has plenty of room. Finally, there is one annoying bug in this early version. Sometimes a bird isn't completely erased when killed during the attack on the ship. If this happens below the central core, the shape blocks the shots. Hopefully, it will be fixed before you read this.

In summary, the game is very well executed and visually attractive (more so on the upper levels than on the first two). However, it is a very difficult game that can become frustrating after continuous and lengthy ignonimous defeats.

QUADRANT 6112

Company: Sensible Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	B-	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B-	VALUE FOR MONEY	C-
GAME DEPTH	C-	GRAPHICS	C	HOLDS INTEREST?	C

Quadrant 6112 involves an interesting variation of the usual shoot-'em-up game. You maneuver a spaceship around a quadrant consisting of forcefield boundaries and two square shaped Star Gates set apart in the center of the screen. Since you can't pass through these boundaries, your ship bounces harmlessly off of them. Enemy starships bounce around within the two Star Gates, but occasionally they emerge into normal space. You can shoot these down with your button-activated laser cannon, or, if things get too hectic, with your three space bar activated "heat seekers." Points are awarded for either scouting the four corners of the quadrant (a lap), or for killing the four different attack groups. And, for an added challenge, an alien commander who is both fast and deadly will occasionally engage your ship in combat.

The game is easy to play, although it may take some time to master. Holding down the fire button for more than a moment starts the thrusters. Like any object, the ship has inertia and is likely to strike the force field walls often as you learn to fly it. While the strategy is often a game of cat and mouse using the Star Gates as obstacles and shields, some may prefer the all out assault approach to winning this game. High scores are saved to the disk.

SNEAKERS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	B+
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	B

SNEAKERS is a whimsical invader type game with eight separate groups of characters or targets at which to shoot. Its variety makes this program a cut above its predecessors. Perhaps the most endearing characters are the sneakers and the fangs. Sneakers are cute half-shelled characters with shoe-clad feet that move up and down as they scurry about the screen while attempting to land on your moveable gun turret at the bottom. There are creatures that move in a rocking pattern at the top of the screen, occasionally turning into fangs that plunge to the bottom in an attempt to pierce your gun. Flying saucers that shoot back, cyclops that move lower and lower on each horizontal pass, a meteor shower, and, finally, the deadly scrubs; all inhabit this game.

Some of the creatures are easily defeated while others are dreadfully hard to destroy. If you manage to survive long enough to defeat each of the nine groups of creatures, you advance to a more difficult level. The object of this game, like others of its type, is to score as many points as possible with six expendable ships. Highly entertaining.

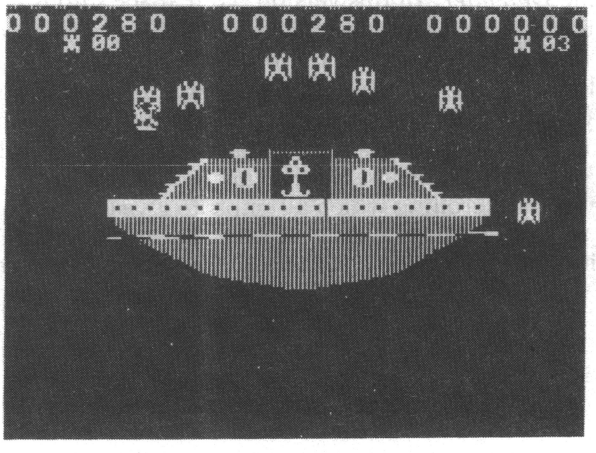
ALIEN AMBUSH

Company: Micro D
Language: Machine Language
Hardware Requirements: 48K

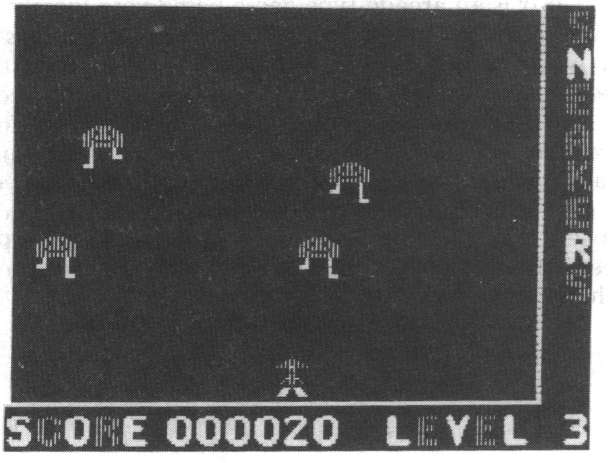
Department: Entertainment
Sugg. Retail: $34.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	D+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	C+	VALUE FOR MONEY	D
GAME DEPTH	D	GRAPHICS	C	HOLDS INTEREST?	D

Alien Ambush is another one of those so-called shoot-'em-up games. This time you defend your paddle controlled ship against a horde of aliens who attack singly, then split in two when hit. These fragments, actually two smaller replicas of the original, bounce off the screen edges endlessly until you either kill them, or you are destroyed by collision. After defeating half a dozen or so of different alien shapes, aliens appear in pairs. While the game definitely becomes more challenging, loss of a ship starts the sequence from the very beginning again. Thus, unless you are very adept at this game, you will never see any of the more advanced game features. *Alien Ambush* doesn't offer anything new in what has become a tried and trite game formula.



FALCONS



SNEAKERS

EPOCH

Company: Sirius Software
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	B–	GRAPHICS	B	VALUE FOR MONEY	C

EPOCH is a pseudo 3-D space arcade type game. One's patrol ship is assigned to kill as many alien ships and bases as possible before running out of time, ammunition or fuel. Control is implemented by joystick (spring centering is best, because any movement of your steering engines uses fuel). The paddle buttons accelerate and decelerate your ship while the space bar or simultaneously pressing both buttons emits a withering blast.

It doesn't take long to realize that by aimlessly chasing enemy ships, one burns fuel quickly (too quickly). Employing simple tactics of cruising slowly leads to enough drifting within range, with many passing friendly bases for refueling and an occasional time portal for regaining time. In fact, if one became proficient, one could make a single game last for hours and score a very large number of points. It's not that the game is that easy, but the ships don't annihilate you when you are hit. Rather, they just subtract several hundred fuel points.

The graphics are nice, although it is hard to tell bases from ships at a distance. Only when they get close can you tell which are targets. Of course, most targets shoot back. The reason we state that the game is pseudo 3-D is that if a ship moves off the screen because of your steering and you try to lock sights with it again, it isn't there. The program does not keep track of objects that have left the screen. Otherwise, objects approach in true 3-D fashion.

EPOCH isn't a game that one gets totally involved in, for it lacks the excitement of many of the faster arcade games. However, it is a fair game with good graphics and will please many space game fans.

TORAX

Company: Creative Computing Software
Language: Machine
Hardware Requirements: 32K

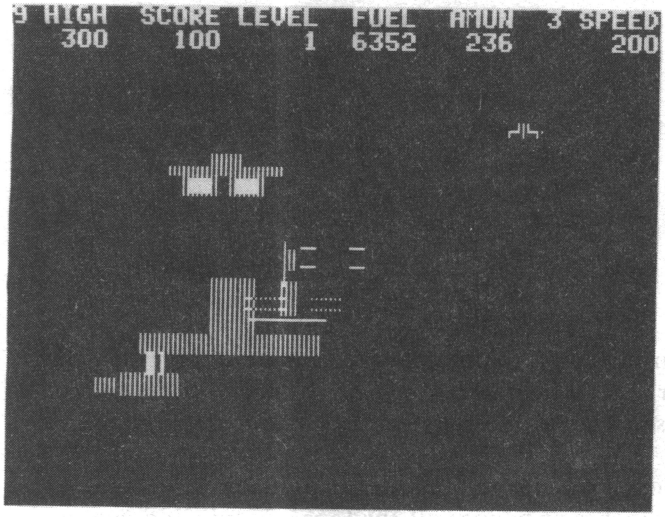
Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

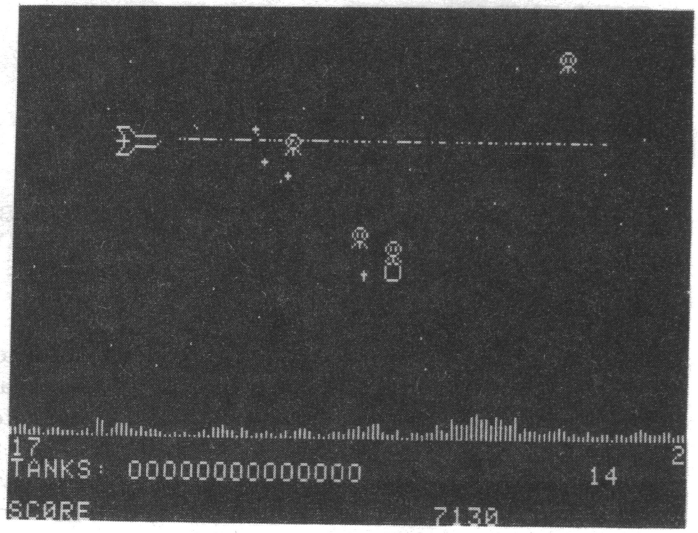
Torax is an arcade-type game based very loosely on the game *Defender*. In this version, your space ship is flying over your home planet while a fleet of enemy aliens attempts to steal the last of your nuclear fuel tanks. They attack in waves of 30 ships. Each ship either attempts to steal a fuel tank or it fires a salvo of missiles. You must maneuver your spaceship vertically into position by paddle control and destroy their ships with your particle beam cannon.

The game requires skill to shoot the aliens without destroying the tank. One starts with twenty tanks, with an extra tank awarded after each attack wave. The game is easy at first but becomes more challenging after several attack waves. The game ends when either you lose your three patrol ships, or lose all of your fuel tanks.

The game's graphics are only fair, at best, with nondescript ground scrolling which attempts to give the illusion of speed. The game itself is fun yet simple, and tends to become repetitious after awhile. It does, however, maintain a permanent record of high scores which are saved to disk, so if one is trying for a high score, the game can become challenging.



HADRON



TORAX

HADRON

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	B+
GAME DEPTH	B+	GRAPHICS	B+	VALUE FOR MONEY	B

HADRON is an excellent three-dimensional space arcade game. It is a definite improvement over the author's earlier game, "Epoch". The object, as usual, is to destroy as many of the enemy's fighter craft and surveillance ships as possible before running out of fuel or ammunition. The goal is to follow the returning fighter craft back to their fuel base and destroy it. Accomplishing this mission results in refueling and rearming your ship while advancing you to a higher level wherein fighter craft are different and deadlier.

What sets this game apart from the homogeneous shoot-'em-up is the variety of animated enemy spacecraft and the skill required to destroy them. Each craft is vulnerable only in certain spots, which are clearly indicated in the HADRON foe chart. Patrolling fighter craft are vulnerable if hit in the engine exhaust ports. There are optical sensing craft that play peek-a-boo using their susceptible-to-destruction gear, plus relay stations that can be destroyed with a direct hit on their rotating antenna. Included, also, are about twenty different targets, with a high speed saucer being the most difficult to hit. There are also fields of asteroids that must be blasted away or avoided and several undocumented space craft.

The control system defaults to joystick control; keyboard play is also possible yet not recommended. One joystick button accelerates, the other decelerates. Pressing both simultaneously fires your gun. The steering sensitivity can also be adjusted, using the numeric keys 1 through 5.

There is a considerable amount of return fire from patrolling enemy fighter craft. One can reduce this by quickly destroying many of the enemy fighters. A direct hit on your shields by either enemy flack or collision reduces your energy by nearly 200 units. Fuel is also expended by steering and speed changes. While conserving fuel is important if one attempts to attain a high score, there is an adequate supply for a game lasting from five to ten minutes.

The graphics are very good. Although some may be disappointed by the block-shaped asteroids and space craft, as ships get closer they acquire an amazing amount of detail. The three-dimensional display is realistic, with closer objects hiding parts of background objects. The only criticism extended concerns objects which leave the screen edges and don't reappear even if one returns to the point at which they vanished.

The game's concept is very sound, as well as very enjoyable to play for extended periods of time. It is not an extremely fast action game but it is one in which the player becomes totally involved. The game offers plenty of variety and requires precise sharp shooting skill. It comes highly recommended by this game-playing reviewer/fanatic/addict (choose one).

STAR BLAZER

Company: Broderbund Software
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $31.95
Availability: 8
Disk or Tape: Disk*

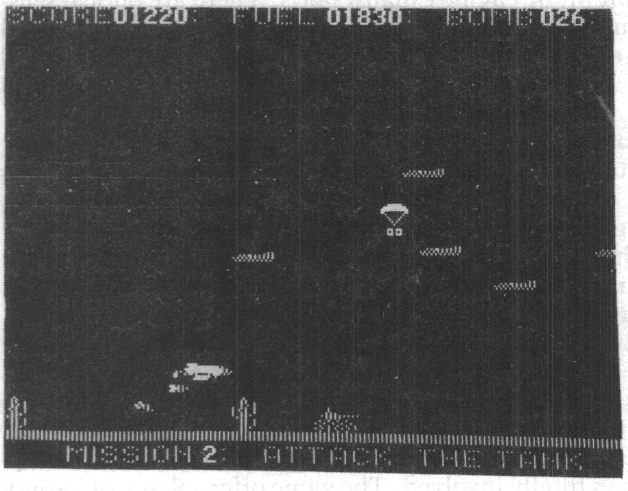
OVERALL RATING	**A**	CONTROLABILITY	**A**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**A**	DOCUMENTATION	**B**
CREATIVITY	**B**	CHALLENGE	**A–**	VALUE FOR MONEY	**A–**
GAME DEPTH	**A**	GRAPHICS	**A**	HOLDS INTEREST?	**A**

Star Blazer is a five level scrolling arcade game, where your mission is to destroy various ground targets on each level by low level aerial bombing. The mission takes place over arid oil field terrain replete with oil derricks and cactus. What sets this game apart and elevates it to star category is the game's fine detail and technique required to kill a target or simply to stay alive.

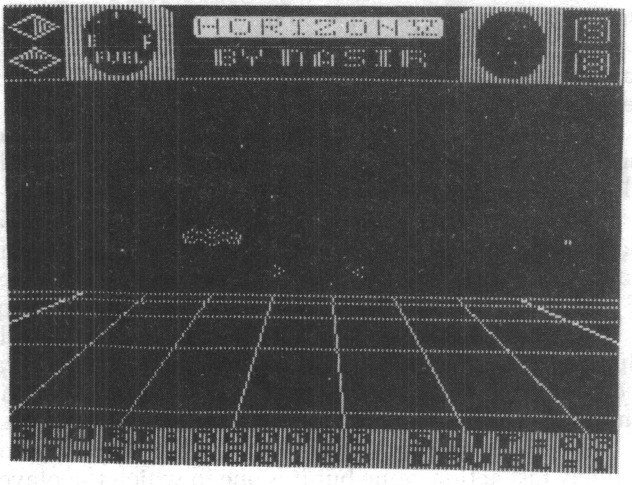
The fine detail in the game is outstanding. Bomb bay doors open when your plane descends to low level bombing, and bombs hitting trees or cactus either get snagged in the branches or bounce off the tops and spin end over end before plopping into the sand. A collision with a tall oil derrick shears off the structure and results in fragments of your plane arcing slowly to Earth. And while you're trying to maneuver under a spare fuel tank parachuted to you by a friendly supply ship, you watch the chute cords cut by enemy craft, and then, just barely missing the catch, you view the high octane fuel explode on impact with the ground. Then there is the sheer beauty of watching one of those tank-fired, ground-to-air, heat seeking missiles just miss the rear of your bomber as you perform a quick but subtle maneuver, and continue to watch in amazement as it arcs overhead, does a 180 degree turn, and attacks from the front while you desperately try to down it with your pulse cannon.

Developing a technique to deal with each of the targets in the five missions is the key to winning this game. Bombing the radar in mission one is relatively easy except that the radar is often under a tree or the far side of an oil tower. This requires pulling up fast and lobbing the bomb in. You'll lose many planes perfecting this trick. Bombing the supersonic tank on level two has many solutions. Everyone who plays the game has a favorite strategy, since no matter how fast you fly or how far you lure the tank towards you, the bombs miss target. Some claim the cactus slows the tank just enough to catch it, others try altering the bomb's trajectory through clever flying, while some kill it by luring it under a falling fuel tank. The third level requires care and patience to either shoot the aerial mines and slow transports, or play cat and mouse with them while awaiting your ICBM target. The trouble is that they tend to keep you away from your target. Dealing with the missile and tank on level four isn't as bad, but avoiding two missiles fired nearly simultaneously on level five — no way.

Star Blazer is played with a joystick or by keyboard. The game is very enjoyable using a joystick, and definitely addicting. I only wish there was a quick way to reach level five, because I need the practice.



STAR BLAZER



HORIZON V

PROCYON WARRIOR

Company: Synergistic Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**D**	CONTROLABILITY	**C –**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**D +**	CHALLENGE	**C +**	VALUE FOR MONEY	**D**
GAME DEPTH	**D**	GRAPHICS	**B**	HOLDS INTEREST?	**D +**

The game *Procyon Warrior* is another mediocre shoot-'em-up game. This time your space station, Procyon, must be defended against a mother ship and three fighter drones. You have two weapons, a movable plasma bomb firing platform, and one movable nutrino missile to use against the mother ship. The trouble with this game is that both of these weapon systems are controlled by separate paddles. Since you can't win if you lose either weapon, it either becomes a two player game, or you use a joystick and attempt to learn which positions move the weapons in which directions. It requires some coordination since the firing platform doesn't move freely past the rocket. The graphics are good on this game, but it often ends very abruptly with your one life.

A second game, *Appointment at Aldebaren*, is included on the disk. A player's immediate reaction to flying through a three dimensional asteroid field for the first time is "wow." Unfortunately, this is not a game of shooting asteroids, but a game of navigating through them in an attempt to sustain the least damage without being thrown off course. And this game wouldn't be complete without an occasional enemy ship that engages you in combat.

HORIZON V

Company: Gebelli Software
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

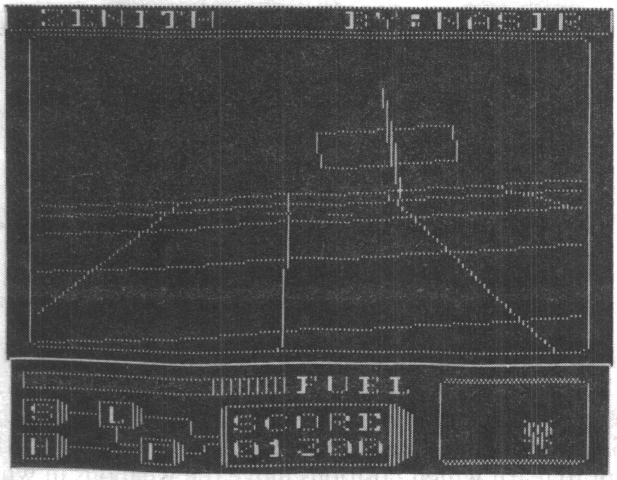
OVERALL RATING	**C +**	CONTROLABILITY	**C –**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C**	DOCUMENTATION	**C +**
CREATIVITY	**B –**	CHALLENGE	**C –**	VALUE FOR MONEY	**C**
GAME DEPTH	**B –**	GRAPHICS	**A +**	HOLDS INTEREST?	**C –**

Horizon V is a three-part space game done in superb three-dimensional graphic style. Your spaceship hovers over a planetoid swarming with alien craft which are visible on your radar screen. The ship, equipped with shields and torpedoes, can be maneuvered about the planet in pursuit by either keyboard or joystick control. The ship, however, has an exhaustible supply of fuel. It must be steered to a position on the planetoid that has a time warp. This position is indicated by two arrow sets that show your relative position in relationship to the hole. When they are both zeroed for four seconds you enter a time tunnel or port.

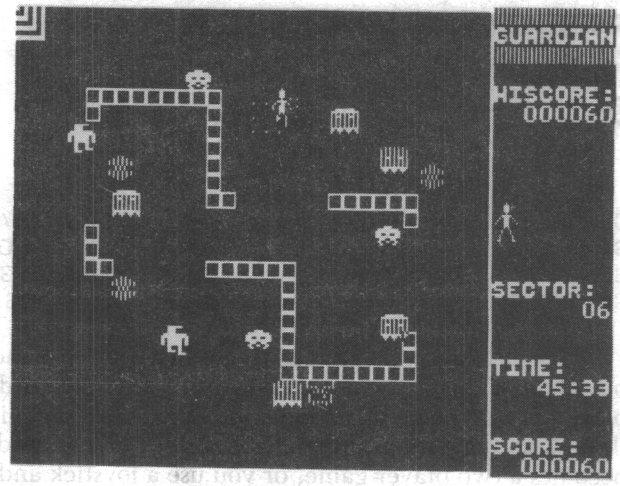
This tunnel is a swirling vortex filled with aliens who appear and attack your ship. Although they are hard to hit as you sweep back and forth through the tunnel, your ship is invulnerable to their attack. The display is probably the most impressive and imaginative graphics that we have seen to date. The effect of roll and forward or reverse travel is entirely controllable, and with practice you can learn to hit these aliens quickly. But most of the time the success of your attack seems to be blind luck.

Upon killing all of the tunnel aliens, your ship emerges into space where a set of floating rings defines the entrance to a vortex-like supply ship. This part of the game is very abstract, but the skill involved is in lining your ship up with the very center of these floating circles for at least several seconds. Success is rewarded with a refueling and a return to the planetoid.

Unfortunately, this game is not at all challenging. The alien craft on the planet rarely shoot back, and thus are easy to kill off. You can always activate your shield in plenty of time to block their projectiles. Of course the aliens in the tunnel never shoot back. The biggest challenge in the game is to reach your fuel base before exhausting your fuel supply. Although the joystick mode would seem the easiest in a three-dimensional game, the stick (non-spring loaded is used) is much too sensitive over a narrow range of joystick movement. It is nearly impossible to hold position on the planet for the four seconds required to enter the tunnel. Keyboard mode, regrettably, is much easier. In summary, this game is easy to play, has impressive graphics and animation effects, but lacks excitement.



ZENITH



GUARDIAN

ZENITH

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C**	DOCUMENTATION	**C+**
CREATIVITY	**C**	CHALLENGE	**C+**	VALUE FOR MONEY	**C+**
GAME DEPTH	**C+**	GRAPHICS	**B+**	HOLDS INTEREST?	**B–**

Zenith is one of those Nasir space games that has interesting graphics, yet is predictable and not very challenging. The object is to protect a partially built space city from alien attack. Your fighter plane is highly maneuverable and armed with a laser. The enemy, flying oddly shaped geometric ships, often bail out over their own territory, and with skill can be captured and traded for fuel and repairs. The trick is to capture and trade aliens quickly, for they turn blue and disintegrate after only a few minutes of captivity.

The graphics display, a view of the terrain out of the front cockpit, is extraordinarily fast for an Apple computer. The view, as in a flight simulator, banks back and forth rapidly in response to your joystick control. You can swoop and soar like a space jockey without worrying about crashing. The action is so rapid that you can become nauseous while playing the game on a six foot screen.

The enemy's tactics are to set fire to your buildings. Burning buildings appear as flashing lines on the display or as fires on a map that can be requested by pressing the ESC key. The aliens also shoot at you, but their fireballs are so slow that they can easily be dodged. Your job is to repair these buildings by flying over them and pressing button #1. This same button is used for capturing aliens, while button zero is for laser fire.

The game is much easier to play with joystick control than with the slower keyboard control system. One gripe I have is that you are never sure if you made a kill. The alien often vanishes whether you hit it or not, often because you flew past it. However the score reveals the real results. I wouldn't say the game has much depth or will hold your interest for long; it depends on the individual. The game does have merit, but I would recommend trying it before buying it.

GUARDIAN

Company: Continental Software
Language: Machine
Hardware Requirements: 48K Apple II or II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

You play the *Guardian* of the sacred "Emerald of Syrinx" in this space western action arcade game. Your mission is to safely deliver the gem through six levels of the Dungeons of Kailyn. This is not an easy task, for the evil creatures from all your favorite arcade games pursue you in the maze-like levels.

Starting in the center of a maze of harmless walls on level six, you guide your hero by either joystick or keyboard control. You aim and fire your laser pistol by holding down the button while aiming the gun. The hero squats and aims while the button is depressed, and fires when it is released. At first the creatures ring you and prevent you from reaching the stripped teleportation chamber at the corner. After firing one shot, they immediately converge. Most are stopped by the maze walls, but a few ooze right through the walls. It becomes a fast and furious fire fight as you race to the nearest teleport chamber, which just happens to change position to another corner with each alien killed. The time limit on each level doesn't let you dwaddle.

The lower levels of the dungeon are more difficult. Levels three and four have lethal walls indicated by red, while levels one and two have walls that vanish after about five seconds, leaving you with a dim memory of where they were. Any contact with these walls means instant death. Killing all the aliens on any one level adds to your high score, but in an odd sense of logic, killing that last one gives you another screen full. The best strategy is to kill only those that block you from completing your mission. However, winning the game with a low score can be as meaningless as not winning at all. While it is not very difficult to complete the mission in normal play mode, the expert mode is much more challenging in that the game doesn't end when you survive all six levels. The expert mode allows you to shoot for a high score. In sum, *Guardian* is a diverting game for dedicated arcade fans.

ELIMINATOR

Company: Adventure International
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**C+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**B**	VALUE FOR MONEY	**C+**
GAME DEPTH	**C+**	GRAPHICS	**B–**	HOLDS INTEREST?	**B–**

Eliminator is a very fast action space shoot-'em-up game, where the object is to destroy as many alien objects as possible. Your joystick controls a laser-equipped fighter. Thus the ship's direction can be easily reversed, thrusted, and vertically guided while battling a screen full of aliens.

In a token attempt to simulate horizontal scrolling, several moons move opposite the ship's direction. But the effect of ground scrolling that would have added to the illusion of motion is missing since the game is set in deep space. The aliens, however, move correctly in relation to your ship's thrust and velocity. These aliens shoot back at you during your attack. Your ship's shields can withstand sixteen hits before destructing, but a direct collision with an alien costs you a ship. Survival is the key, and if you can last long enough, you warp to a tougher level where more types of aliens in greater numbers are sure to make mince meat of your three ships. One nice feature allows you to start at one of three advanced levels. Arcaders might like the extremely fast action of this game.

BATTLESIGHT

Company: Versa Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C–	VALUE FOR MONEY	D
GAME DEPTH	D	GRAPHICS	C	HOLDS INTEREST?	D+

Battlesight is a real time tank warfare simulation that was developed by an Army major and several programmers. Taking the approach that real tank warfare involves the time and efficiency of the tank crew in reloading the main gun, the inaccuracy of shelling at long distances, and slow turret slew rates, the programmers produced a 3-D game that lacks the excitement of an arcade game yet is somewhat realistic. With gun reload times approaching ten seconds, you're essentially a sitting duck when five or more Russian T-62 tanks are approaching below your hillside position. The strategy becomes: shoot first, fast, and move often.

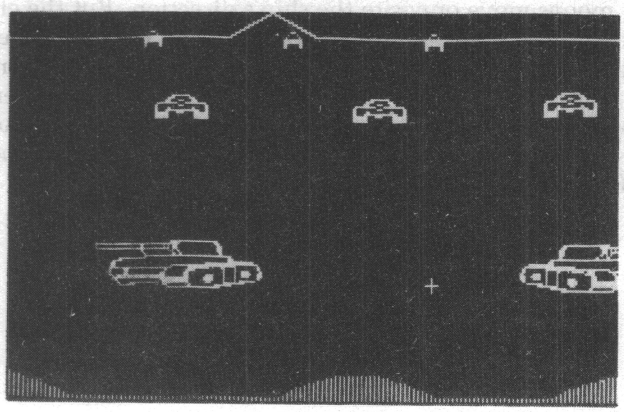
Unfortunately, the simulation is not as realistic as the authors would like us to believe. The viewfinder, in all tanks, has a rather narrow field of view, more periscope in nature or similar to the view in the arcade game *Battlezone*. This game, on the other hand, has a rather wide field of view showing three to five tanks abreast. Actual tank turret slew rates are much faster than in this game. Also, one of the most important factors in firing shells is the enemy's range. This is totally ignored here, although the program is less likely to award a kill at greater distances. As I said, the graphics are three dimensional in that tanks will move off screen as the tank turns, but the background unrealistically remains stationary. Only three size tank shapes are used for the display. Tanks moving forward suddenly grow in large, discontinuous jumps.

The game begins with five defending tanks situated on a hillside overlooking a major artery for the invasion. Several columns of tanks appear in the distance. You can aim the tank turret with a joystick, or drive the tank either by turning the tank on its treads or moving up and down along the hillside edge by depressing button #1. Button #0 fires the main gun and the space bar fires machine guns for downing surveillance aircraft. Enemy helicopters firing Sagger anti-tank missiles must be downed quickly with the main gun before the missiles reach your position.

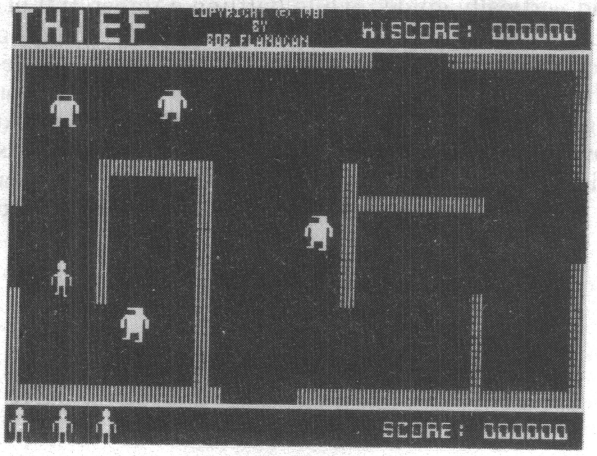
As in all tank warfare, it is best to conceal and protect the tank by maneuvering behind the grassy knolls which may possibly be blasted away in the heat of the battle. Don't squander ammunition, since it takes time to reload, and firing reveals your position to the enemy. It is often best to wait until the enemy gets closer. But this, too, has its disadvantages as there may not be sufficient time to kill all the enemy before they get past your position. The game ends when either five tanks escape or you lose your five tanks.

Battlesight has five levels of difficulty, and one can opt for night fighting for an added challenge. This option reveals enemy tank positions during the brief flash of the enemy's return fire. Although levels one to four get progressively harder as the number of enemy tanks increases, level five is essentially for beginners. This level allows one to shoot rapidly; every two seconds for inefficient crews, and every second for efficient crews. This level, although more arcade like, offers virtually no challenge. The other levels require much more decision making for survival. Should one risk stopping to repair a damaged turret, for example, or attempt to aim the gun by maneuvering the tank treads?

Overall the game has considerable merit with elements of realism. While some arcade players have liked the game, others found it slow and boring. Despite its weak graphics, I think the game will appeal more to war game enthusiasts than to arcade game players.



BATTLESIGHT



THIEF

THIEF

Company: Datamost
Language: Machine & Applesoft in ROM
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B**	DOCUMENTATION	**B**
CREATIVITY	**C+**	CHALLENGE	**B+**	HOLDS INTEREST	**B–**
GAME DEPTH	**B–**	GRAPHICS	**B–**	VALUE FOR MONEY	**B**

THIEF is a very good rendition of the arcade game, Berzerk. One enters a building whose rooms are guarded by robot sentries (sound familiar?). The object is to score points by killing all of the room's robot guards within a given time, then advance to the next room through one of the four side doors. One's time is limited, because sooner or later a bouncing killer ball will enter the room from the left side of the screen

One guides the nerveless Hi-Res Hero through the room's maze by using a joystick controller. Hitting a wall results in the loss of one man. You have four, altogether, so all's not lost. One aims and shoots by holding down the firing button while *aiming the* laser pistol with the joystick. Releasing the button fires the pistol. This works very well on a spring-centered joystick because once the gun fires, you can release the stick and consequently remain stationary after firing. Players without this type of joystick will have to be careful to center the stick quickly or they will immediately move in the direction of fire and probably crash into the wall. Hard cheese! This tendency to become unglued can be overcome by practice, however. The game is easy at first, but after you accumulate over 700 points, the robots become quite deadly with their fire. Failure to clear a room completely will often result in a blocked door that you can't reenter. The graphics are very good and the game is challenging at higher levels.

SHUTTLE INTERCEPT

Company: Hayden
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**D–**	CONTROLABILITY	**D**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D+**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**D**	CHALLENGE	**C+**	HOLDS INTEREST?	**F**
GAME DEPTH	**D+**	GRAPHICS	**C–**	VALUE FOR MONEY	**D–**

Shuttle Intercept is a rather uninteresting game in which your mission is to retrieve space satellites with the space hook on your paddle controlled shuttle craft. Your craft, which can move up and down, can be positioned just beneath a passing friendly satellite to retrieve it. An encounter with an enemy flying saucer is relatively harmless, except that it pushes your sky hook back into your shuttle. It is best to avoid them, or quickly shoot them down since time is critical in retrieving the ten passing satellites. Once the ten have passed, your shuttle craft immediately goes into the dangerous hyperspace mode.

The hyperspace game mode that alternates between each increasingly difficult quantum level is the most frustrating part of the game. Meteors that hurl at you from the right are difficult to avoid because your ship responds sluggishly to any change in paddle position. The slowly moving missiles that track you can be out-maneuvered by a skillful pilot. The usual outcome during hyperspace is the loss of all three ships, unless you are either lucky or learn the set piece pattern of the meteor shower. If you do succeed in traversing the meteor shower, you advance to harder levels where enemy satellites, missiles, and an occasional missile clutter your orbit.

The game is simply not inspiring enough to hold your interest beyond a few tries. A few frustrating encounters with the hyperspace mode will defeat all but a few dedicated arcade players.

ORBITRON

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	D+	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C–
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	D
GAME DEPTH	D+	GRAPHICS	D	VALUE FOR MONEY	D

Seven alien drones take up their positions above an orbiting space station, protected only by rotating meteor shields. One by one, each a drone places a killer satellite in orbit around your space station. It becomes a matter of timing and aiming skills to draw a bead on the satellite through the gaps in your shield before it completes an orbit. At that point, your shields become ineffective as the orbiting satellite plunges into your station. You also have a chance to knock out the alien orbs through gaps in their rotating shields while their killer satellites slowly complete an orbit. Once you have destroyed the last remaining satellite, the drones will leave. Next, a space ship deposits two stationary missiles which you must knock out in the four or five seconds before they attack. At that point, you advance to a harder level. There are seven levels, each having faster orbiting satellites and drones with better shields.

The game is keyboard-controlled, with the #1 and #2 keys for gun positioning and the space bar for firing. One wonders what the shields are for, since they aren't effective against the enemy, but only hinder your firing direction. Of course, without them, there wouldn't be any challenge. The game and graphics are average.

SPACE RAIDERS

Company: USA Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST?	C
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

SPACE RAIDERS is Paul Lutus' version of Atari's "Star Raiders" game. The object is to rid the 36-sector galaxy of aliens. After choosing an enemy occupied sector, one hyperspace jumps to it, then battles with one or more alien ships. The game is very playable, since one can use a joystick (also keyboard) to maneuver your ship within the 3-D sector. Your ship has shields and scanners. Unfortunately, the battle sequences, unlike the Atari version, are not very exciting. Although you can see your shots nearing your target, the alien's return fire is blah. There's no torpedo closing in on your ship, just a ping on the screen followed by a brief Lo-Res color flash, and sometimes a message that some damage was sustained. The enemy ships don't try to seek you out; rather, you chase them at various engine speeds, try to keep them centered on your crosshairs, and then destroy them.

There is a time limit of 50 stardates to rid the galaxy of all aliens. About a third of the galaxy's sectors have starbases where one can reenergize. Most can only be reached after defeating the enemy in that sector. There are four levels, although it eludes this reviewer how one can set the level. I assume that if I advanced to a higher rank by finishing a game, the program would set a tougher level, although this isn't made clear in the documentation.

The graphics during the flight sequences are very good, the battle sequences fair to good and hyperspace sequences poor. Overall, the graphics are solid. The game is fun and playable but not overly challenging.

MARAUDER

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

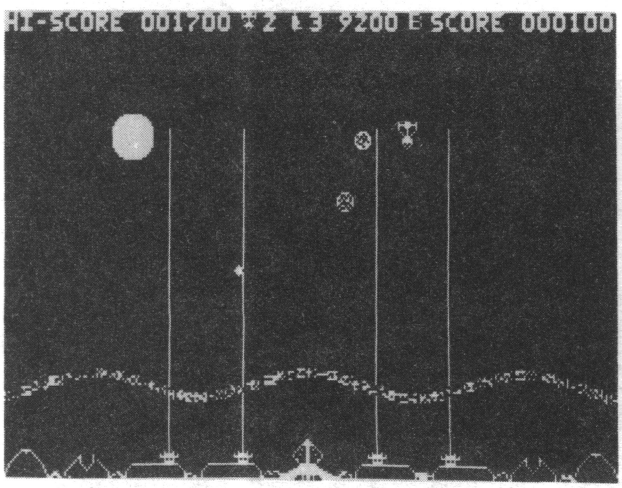
OVERALL RATING	B	CONTROLABILITY	B–	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	B–	CHALLENGE	B+	VALUE FOR MONEY	B
GAME DEPTH	B	GRAPHICS	B	HOLDS INTEREST?	B

The *Marauder* arcade game is a two level assault on a well-fortified alien city set on a distant planet. The city is defended by a fireball launcher, two aerial mine launchers, two missile bases, two or four turret lasers, and a shield which encompasses the entire city. The object is to destroy all defenses, then enter the city through the crater beneath the fireball launcher. Once beneath the city in part two, the player must navigate the robot guarded passages in the labyrinth in search of the power station. Each of the two parts of the game can be played separately or as a two part mission.

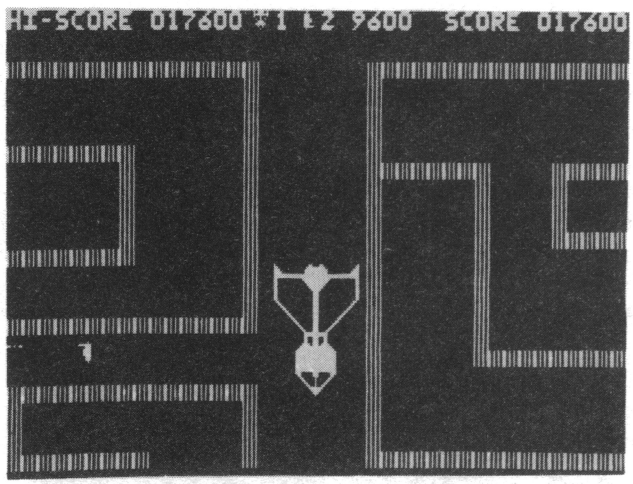
Attacking the city's defenses in part one can be relatively easy, or impossible, depending on the difficulty of the setting. There are nine levels. The easiest levels have a stationary shield, two turret lasers, and fireballs that don't track you. The more difficult levels have moving shields, more lasers, and fast moving fireballs and aerial mines that home in on your position almost immediately. You have to be quick and alert, and must develop a strategy to deal with each of the weapons. For instance, following a gap in the moving shield is more effective than continually trying to blast your way through in a stationary assult. And the fireball launcher must be destroyed relatively quickly, that is if you can avoid being trapped between two lasers by a descending aerial mine. Overall this first level is an excellent arcade game by itself.

The second level is similiar to the *Berzerk* arcade game, with the additional goal to find and destroy the central power station, then escape alive before being trapped by a labyrinth's falling ceiling. The maze of rooms consists of a number of exits and passages guarded by deadly robot guards. These guards appear only if they are in your line of sight. You must be particularily careful when rounding a corner since a robot might be hiding out of sight. Your 9 marauders (3 in each ship) are each armed with a laser. Each time it fires, the trajectory of the last shot is cut short. Thus if your shot is on target, you must wait until the shot kills the robot before firing again. The biggest problem with this level is that the marauder fires his gun off-center, as if he were firing from the shoulder. This would be no problem except the head isn't always above the body. The orientation of the marauder's body changes with direction. The body would rotate clockwise if you moved the figure first to the right, then down, then left, and finally up. If you switch directly from right to left, you find the marauder upside down. The bullet fires from near bottom, while a moment ago it fired from near top. As you can see this is very confusing and, in this case, deadly, as the shot misses a nearby, quick-reflexed robot.

The game itself is fun to play and will be liked by those who enjoy navigating multiroom mazes. But with the rooms rearranged after each succeeding level, a player is unlikely to master a route to win quickly in this game.



MARAUDER



MARAUDER

DOGFIGHT

Company: Micro Lab
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B+	DOCUMENTATION	B
CREATIVITY	B–	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	C+

DOGFIGHT puts you into the pilot seat of a jet fighter in a fast action Hi-Res arcade game for one or two players against the computer. What appears to be a simplistic game of shoot-down-a-dumb-computer-plane becomes a definite challenge as one advances from level to level and encounters an armada of attacking planes. Once a plane is shot down, whether yours or the computer's, the parachuting pilot must be killed before landing to prevent him from returning to the air in another plane. Each player is given four planes and the object is to score as many points as possible. Player control is either by keyboard control or by paddles. As a bonus, one can custom-design one's own game. Multi-player games can be scored as a team. Any help above the sixth level of play should not produce a feeling of shame-faced chagrin on a single player's part; entail the aid of your partner, as point scoring becomes very difficult in this stratified realm.

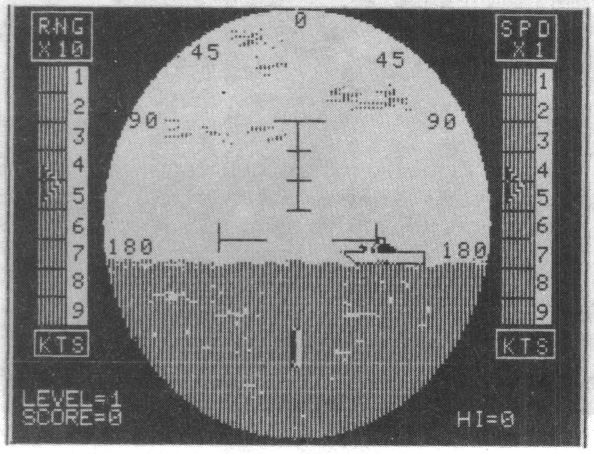
TORPEDO TERROR

Company: Continental Software
Language: Applesoft
Hardware Requirements: 48K

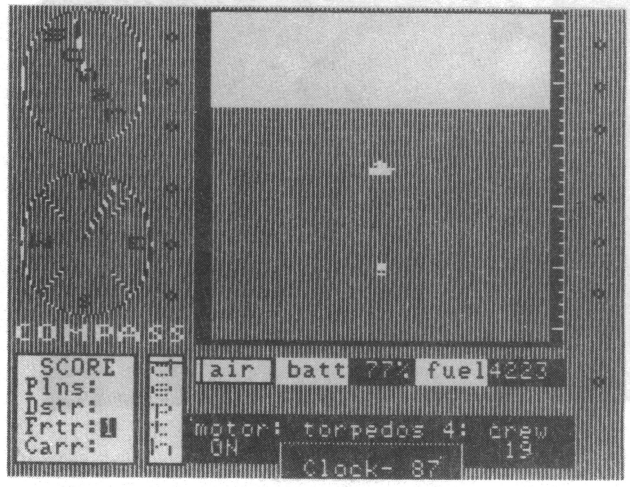
Department: Entertainment
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Disk

TORPEDO TERROR is a game of submarine warfare against convoy ships and destroyers. The object of this arcade type game is to torpedo as many ships as possible. This includes a destroyer, which turns and tries to ram you. From the sound of the sonar, which indicates distance, one sets the speed of the torpedo with the paddle. Launching torpedos and hitting ships is relatively easy on all levels; on advanced levels, you have only one chance to sink a destroyer by adjusting the bow of your ship by using the other paddle.

The graphics, which consist of your view through a periscope, uses Budge's 3-D package for screen animation. The graphics are very good, but the game concept needs work.



TORPEDO TERROR



U-BOAT COMMAND

U-BOAT COMMAND

Company: Synergistics Software
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C–	DOCUMENTATION	C+
CREATIVITY	C–	CHALLENGE	C–	HOLDS INTEREST?	C
GAME DEPTH	C+	GRAPHICS	C+	VALUE FOR MONEY	C

U-Boat Command puts you in command of a submarine in this strategic, arcade action war game. The object is to pursue an enemy aircraft carrier before it can escape to the high seas. Enemy destroyers, patrol boats, and freighters also patrol these waters. All are dangerous in any encounter, and must be quickly destroyed. Enemy aircraft also pose a danger to your surfaced sub, if the aircraft option has been selected at the beginning of the game.

Your submarine has a periscope, sonar, compass, engines for cruising, batteries, an air supply for remaining underwater, machine guns, torpedoes for sinking the enemy and destroying his planes, and a sizable crew. All ship functions can be easily monitored on the Hi-Res display. The view out of the periscope can be swapped for a coastal map which shows the location of your submarine and the fleeing aircraft carrier. Other enemy ships and your own supply ships do not appear on the map. Your submarine's course can be altered using the A and D keys.

Vessels periodically encounter your submarine. They can be monitored on the sonar screen, and be seen through the periscope. Determining whether a ship is friend or foe can sometimes be quite dangerous. You have to keep your joystick controlled sight on the ship until it is close. Most ships look alike, and you don't want to sink a friendly supply ship. However, sometimes they return fire before you have had time to fire off a torpedo. When your ship is damaged, it pays to dive deep.

Staying submerged uses up battery power and a limited air supply. If you are being pursued by a destroyer, it will drop depth charges. These can be seen through your periscope as they float downward and explode at the same level as your submarine. There is little hope by this time to escape alive, for if you stay down too long and your batteries fully discharge, you're stuck. Although it is suicidal to surface, you might get lucky and put a quick torpedo into the destroyer before you are sunk.

The game involves very little strategy. Depending on which difficulty level you play, it is either an easy pursuit of the carrier, or you're continually delayed and harassed by enemy ships and planes. And as an arcade game, it doesn't take much skill to sink ships. The game is much more of a simulation than a true arcade or strategy game. The graphics are good, but the control system is illogical and very hard to remember. For example, they use the X key to surface, and the Q key to turn the motor on. It would have been more logical to use S for surface, D for dive, and possibly Q for motor off. I realize that it doesn't take long to learn their command structure, but many people have innumerable games, each having different commands. It would be nice if there was a logical approach to remember some of these. But overall, *U-Boat Command* is much more interesting than those old, two dimensional, shoot-'em-up "submarine versus destroyer" games.

JELLYFISH

Company: Sirius Software
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

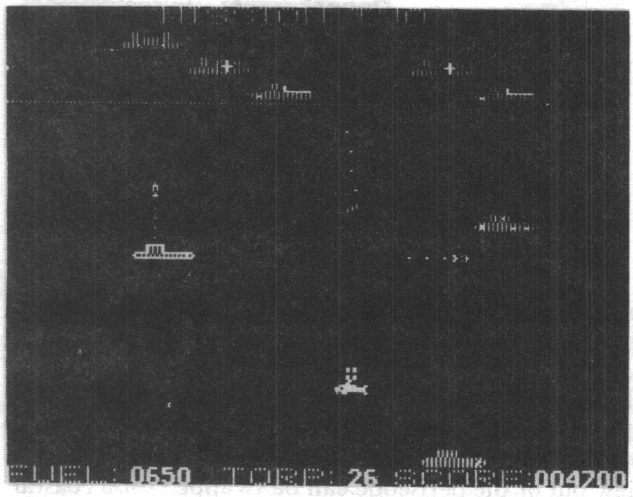
OVERALL RATING	C–	CONTROLABILITY	D+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST?	C–
GAME DEPTH	D+	GRAPHICS	C	VALUE FOR MONEY	C–

Jellyfish is an underseas arcade game in which the mission is to recover nuclear waste capsules from the ocean floor. Either one or two players can compete in the endeavor. The submarine *Dogstar* is equipped with a mechanical arm for latching on to each of the capsules. It also has torpedoes for blasting deadly Jellyfish and octopuses that are intent upon your destruction.

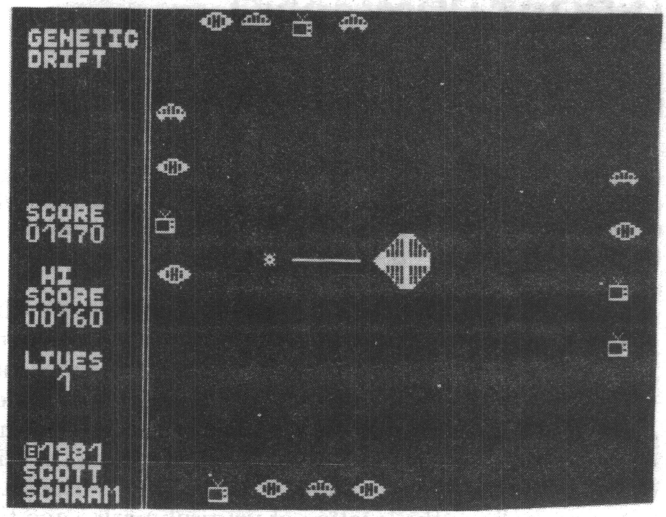
The game is controlled by either keyboard, paddles, or Joyport. Four keys are used for positioning the submarine, and one for firing. Keyboard control is not a very good mode, and the paddles are even worse. It amazes me that the direction of motion must be determined by how far the paddle is turned. It is very difficult, if not impossible, to get used to. Of course, if you elect to purchase an expensive Joyport, you can play the game with Atari joysticks that use the more natural up, down, left, and right movements. But the game isn't worth the added expense.

The one-player game that pits you against those deadly sea creatures that forever dog your every step, isn't much fun. However, the two-player game is somewhat more challenging, as each player can lure the sea creatures into his opponent's path, or kill his opponent in the upward rain of fragments that float towards the surface.

The game, finally, has eight skill levels and three levels of control responsiveness. It is fun for two competing players, but is a slow and tiresome game for one.



SEA FOX



GENETIC DRIFT

ESCAPE FROM ARCTURUS

Company: Synergistics
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	D+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	D+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	D+	CHALLENGE	C	HOLDS INTEREST	C–
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	D

ESCAPE FROM ARCTURUS is a two-part game consisting of SPACE FORTRESS and ESCAPE. These two games are normally linked, with ESCAPE being played after your space fortress has been obliterated, but they can be played as separate games.

SPACE FORTRESS is somewhat similar to Sirius Software's "Outpost". The fortress has four guns that protect each of its sides. Four indestructible enemy ships fire a random barrage at your base. The object is to destroy these incoming projectiles before they hit. You simultaneously aim and fire with the Y, G, and J and space bar keys which form convenient diamond key responses. Rapid shooting is limited by your energy supply, so that accuracy is more important in this game of reflexes. If you survive very long, the attackers move in closer to further shorten your reaction time. Once you have been hit four times, it is time to abandon the planet.

The game shifts to ESCAPE, where one attempts to ferry out the survivors in a fleet of ships. The planet is under attack as you leave the planet, slowly reaching warp speed. Although your craft is not directly under attack, you must destroy the attackers before they pass you with your paddle-navigated ship. If they get through, they will destroy one of your planetary bases. When you have lost all four ships, the game ends.

The game challenge level is just fair. The SPACE FORTRESS part is easier to play than Sirius's "Outpost" because one need not have to control shield placement and firing sequences at the same time; instead you only have to watch your energy supply. The graphics are slightly better. The ESCAPE part is a more simplistic game, but does add some depth to the package.

SEA FOX

Company: Broderbund
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	B-
CREATIVITY	C+	CHALLENGE	B	HOLDS INTEREST?	B-
GAME DEPTH	B	GRAPHICS	C+	VALUE FOR MONEY	B-

Seafox has elevated the classic (yet boring) two-dimensional "submarine against the destroyers" game into an exciting and challenging shoot-'em-up. It is obvious that the author regards Tony Suzuki and his game *Star Blazer* very highly, for this game has very close parallels. *Seafox* is a multi-level game, and each level presents a different mission. As submarine captain, your object is to destroy merchant ships. The submarine is fully maneuverable beneath the surface by either joystick or keyboard controls. Torpedoes can be fired forward at enemy submarines, or upward at ships on the surface. Red Cross hospital ships must be avoided.

Your sub has a limited fuel supply and must be resupplied frequently from a friendly supply ship that passes near the bottom. A trained dolphin will resupply your vessel. However, it takes very quick maneuvering to intercept the dolphin before a giant clam steals his supply pack. The dolphin doesn't linger long, since it needs air from the surface to breathe.

The upper levels are incredibly difficult. Destroyers harass your underwater position with depth charges in level two, while in upper levels you'll have to survive magnetic mines and shots from enemy submarines. The normally safe, deep waters become a very menacing and deadly environment. Altogether, the game is very good, has detailed graphics, and is fun and challenging to play.

GENETIC DRIFT

Company: Broderbund
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	C+
GAME DEPTH	C+	GRAPHICS	C+	VALUE FOR MONEY	C

The principle involved in *Genetic Drift* is that one can mutate the four surrounding sets of attacking aliens into a benign life form. Benign in this case means television sets. The program consists of another one of those rapid reflex games where your space fortress is under attack from all four sides. You must aim the ever-ubiquitous gun, using a diamond pattern set of keys, and shoot down the attacking missiles by hitting the ESC key.

The game is much more involved than the others of its type. During brief lulls in the attack, one can shoot at the slowly moving aliens. Each hit changes it into another form until, incredible as it may seem, their penultimate state of evolution becomes...yes, television sets (a debatable choice, at best!). However, if you hit a television set, it reverts to its lowest evolutionary level (no, not a radio...). If any side evolves completely into boob tubes, that side becomes friendly and shoots valentines instead (preferable to the current t.v. fare). However, during the heat of the battle one is apt to shoot at anything that moves, including friendly life forms.

There are numerous higher and more difficult levels wherein the attack becomes much more intense. At level four, enemy satellites join the battle. Unlike most of games of this ilk that continue until you lose, there is a point at which the player emerges victorious in this one. Borderbund avers that it is a visual surprise. Obviously, this reviewer didn't achieve that stage of nirvana.

The graphics are good and the game is certainly challenging for those that like keyboard-controlled arcade games requiring lightning-like synaptic responses.

OUTPOST

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: *Entertainment*
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	D+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	D+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	D+	CHALLENGE	C	HOLDS INTEREST	D+
GAME DEPTH	D	GRAPHICS	D	VALUE FOR MONEY	D+

Outpost is a game in which fast reflexes rather than strategy or skill determines play. It involves a four-sided space base with guns on each side, and a movable meteoroid shield that can be positioned to protect one side at a time. The enemy attacks different (sometimes multiple) sides at once. You have up to a second to destroy each attacker before he damages your gun or destroys your station.

Periodically, a flying saucer attacks while it orbits your station. It shoots only at the corners where no gun or shield protects your space station, but can be killed when it comes within gun range at the sides. If your gun is hit, it is deactivated. Either two hits to a side or three hits to a corner will destroy your ship. You get three ships. The game does become harder as you advance in levels. The game is controlled entirely by keyboard. The I, J, K, and M keys control the gun position, and the W, A, S, and Z keys move the shields. Overall, the game is a dull, unchallenging offering; one, perhaps, that you will play a few times, after which battle and keyboard fatigue sets in.

STARMINES

Company: Softape
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: *
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	D+	SKILL INVOLVED	D+	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	D	HOLDS INTEREST	D
GAME DEPTH	D	GRAPHICS	D+	VALUE FOR MONEY	D

STARMINES is a mindless space game in which one attempts to blast a pathway through an asteroid belt. The player is given only a fixed amount of laser energy, but if one disintegrates the asteroids with enough accuracy to avoid collision, they can advance to one of four higher levels of difficulty. The graphic impression of travelling rapidly through space is effective, but as a game, one will tire of this scenario fairly quickly.

PHASER FIRE

Company: Gebelli Software
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	D+	SKILL INVOLVED	D	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	D	HOLDS INTEREST?	D
GAME DEPTH	D+	GRAPHICS	B-	VALUE FOR MONEY	D

Phaser Fire is yet another shoot-'em-up arcade game. The mission is to guard the Star Portal against enemy bombers that hope to slip through. These planes attack in waves, and drop their bombs while shooting at you at the same time. Any competent player can successfully deal with them on the lower levels.

Once you defeat the attackers, you enter the Star Portal, where you must guide your ship down a long, narrow tunnel. You must pass through gaps in the lines, while avoiding the sentries that send destructive energy bursts across them. The steering is by paddle, and you can start and stop your ship with the paddle button. This part of the game requires very little skill.

While this is not a very good game, the graphics are better than average. The attacking planes have a three-dimensional look as they grow larger on each approach, then bank and turn around during their escape. But I really couldn't recommend this one except to the game collector.

CEILING ZERO

Company: Turnkey Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**C –**	CONTROLABILITY	**C +**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**D**	CHALLENGE	**C**	HOLDS INTEREST	**C –**
GAME DEPTH	**C**	GRAPHICS	**C**	VALUE FOR MONEY	**D +**

Ceiling Zero is another shoot-'em-up arcade game in which your three gun bases are used to stave off an attack of alien targets which are launched from a mother ship hovering just beyond your micro-deflection beam. The targets, when they invade your airspace, must be eliminated as rapidly as possible as they bounce off the bottom, top, and sides of the screen in ever-increasing numbers as the mother ship sends out more missiles. A single collision with your movable gun base means death. Occasionally, the mother ship launches a landing ship, which descends directly toward the ground. If you miss the landing ship while attempting to pick it off, you lose one of your three gun bases.

After you defeat each group, the micro-deflection beam ceiling is lowered closer to the ground. The game becomes harder at each lower level. There are three types of targets, each introduced during the first three levels, after which they arrive in combinations.

Overall, the game is well done, although uninspired. It will nonetheless interest dedicated arcade players.

SABOTAGE

Company: On Line Systems
Language: Machine
Hardware Requirements: 32K

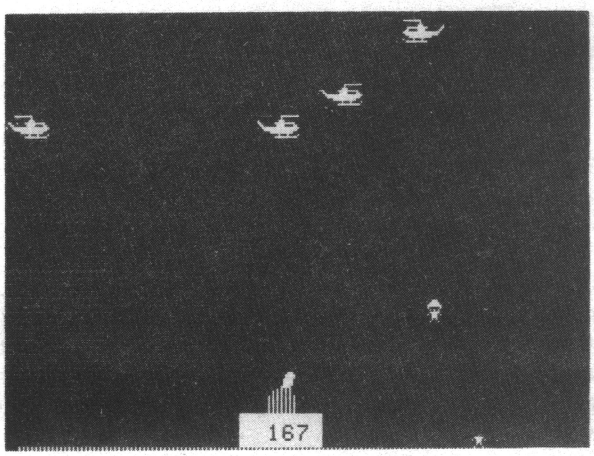
Department: Entertainment
Sugg. Retail: $24.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**B +**	CONTROLABILITY	**A**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B +**	SKILL INVOLVED	**B**	DOCUMENTATION	**B –**
CREATIVITY	**B**	CHALLENGE	**B +**	HOLDS INTEREST	**A**
GAME DEPTH	**C**	GRAPHICS	**B +**	VALUE FOR MONEY	**B +**

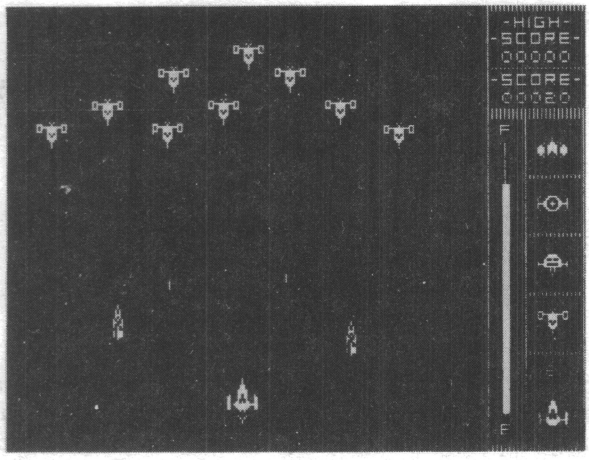
SABOTAGE is a Hi-Res arcade game in which the computer attempts to launch a parachute assault team to blow up your gun position. The main brunt of the attack is done by helicopter, although the computer also attempts several bombing runs during the assault. The object is to defend your gun as long as possible and to accumulate the maximum number of points. Each helicopter downed is worth five points and each paratrooper two points. However, each shot costs you a point. One has a choice of steerable or non-steerable ammunition.

While it might appear to be a trivial shoot-'em-up game, it's not — it is addictive. The level of difficulty increases with your score. Soon there are six to eight helicopters simultaneously dropping paratroopers. Hope is not lost even when the number of paratroopers on the ground approaches what is needed to destroy your gun. Accurate shooting at a soldier's descending parachute will squash a man on the ground directly below.

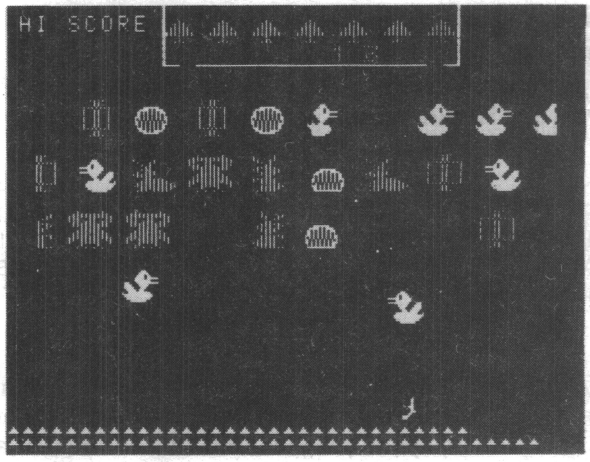
The graphics are extremely well done. Detail even extends to the spinning helicopter blades. A very enjoyable and highly recommended game.



SABOTAGE



GAMMA GOBLINS



COUNTY FAIR

GAMMA GOBLINS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**C**	HOLDS INTEREST	**C**
GAME DEPTH	**C+**	GRAPHICS	**B–**	VALUE FOR MONEY	**C**

The object in GAMMA GOBLINS is to destroy four successively more aggressive waves of attacking alien craft whose object is to separate your ship from your space station's refueling dock. Your ship is steered from side to side by paddle control. Each enemy wave is preceded by several floating mines. They actually inhibit you in crossing from one end of the screen to the other during the last stage of battle unless they too are destroyed. If one can destroy the wave of invaders (they shoot back), then one advances to the next level. If not, you fight another attack group at that same level. Of course, you have to watch your fuel gauge, since you finally reach your moving base, you must accurately steer into the hole in its bottom center to be refueled.

The second level is deadlier. After wiping out the front wave you reach their enemy saucer. It promptly releases three bug-eyed aliens that swirl about your ship and promptly do a number on you if you're tardy in the reaction department.

This game has considerable depth of play and graphically is nicely done. It is modeled after the Astro Fighter arcade game.

COUNTY FAIR

Company: Datamost
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B–**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C+**	DOCUMENTATION	**C+**
CREATIVITY	**C**	CHALLENGE	**B–**	HOLDS INTEREST	**C+**
GAME DEPTH	**B–**	GRAPHICS	**B+**	VALUE FOR MONEY	**C+**

COUNTY FAIR is the most well-done shooting gallery game to date. The Hi-Res animation is cute and fluid. The object is to shoot as many moving targets as possible without running out of ammo. Bonus ammunition is indicated within a temporary target set just below the moving bonus targets in the box at the top of the screen. The hippity-hopping rabbits are an easy target, but the ducks move lower and lower until they gobble up 10 rounds of your ammo. If you can clear all of the screen targets including the trees in the box, you get rearmed and provided with a screen full of new targets. It's a fun game.

STAR VENTURE

Company: Compu Things
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	**F**	EASE OF USE	**C**	ERROR HANDLING	**D+**
GAME CONCEPT	**C**	SKILL INVOLVED	**D**	DOCUMENTATION	**F**
CREATIVITY	**C**	CHALLENGE	**D+**	VALUE FOR MONEY	**F**
GAME DEPTH	**C**	GRAPHICS	**D**	HOLDS INTEREST?	**D–**

Star Venture is an attempt to spruce up the classic Star Trek game with a paddle controlled battle against the Klingons, and several interesting Hi-Res scenes like beaming a party to a Starcity to gather information. Unfortunately, the game is poorly done. The real time battle scenes are crudely animated, move jerkily, and are nearly impossible to aim accurately due to feedback lags from slow animation frame rates. The battle goes on boringly until either the Klingons or your ship are destroyed. Battles cannot be aborted. The warp drive doesn't work properly or needs explanation that is lacking in the documentation. Actually, the documentation consists of a list of commands and a lengthy warning on trying to catalog the disk. Error messages appear so fleetingly that there is no time to read them. And there is no error checking in situations when one is near a planet and attempts to beam men up and down. One could probably go on endlessly discussing the program's shortcomings, but should simply say that the program isn't worth buying.

SPACE QUARKS

Company: Broderbund
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**B–**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**B–**	HOLDS INTEREST	**C**
GAME DEPTH	**C+**	GRAPHICS	**C**	VALUE FOR MONEY	**C**

In this shoot-out scenario, colorful *Space Quarks* dance around the screen in a series of choreographed motions until disturbed by your cannon fire. Some of the creatures will continue their dance and only shoot back, while others will break out of formation and dive bomb your tank. Your survival depends on determining which color creatures are which.

Each time you destroy an entire set of creatures, you are awarded an extra tank and, unfortunately, confront a new group of creatures. After six sets of creatures, the disk loads a new set; however, these lack the distinctive coloring that distinguishes the sitting ducks from the kamikazes.

The game is a fair challenge for those that like shoot-'em-up space creature games. The graphics are smooth and the game is quite playable. To provide a real stimulus, try playing this game on a monochrome receiver — roulette for Russians.

NEPTUNE

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B–	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B–	VALUE FOR MONEY	B
GAME DEPTH	B	GRAPHICS	B+	HOLDS INTEREST?	B

Neptune is an underseas scrolling arcade game with a mission to destroy enemy robot amphibians that have invaded neutral waters. The depths are inhabited by Neptunians, pupfish, jellyfish, Octonians, and sharks. Most of these creatures can be destroyed either with your lasers or dropped bombs, but the Octonians must be avoided.

The ship is maneuvered easily back and forth and up and down by joystick control. Keyboard controls are also provided for those brave souls who shun electro-mechanical aids. The undersea terrain, consisting of rugged underwater cliffs and caves that sometimes dead end, are scrolled smoothly beneath your ship. Pacman shaped deadly bubbles tend to keep your ship from venturing too close to the bottom. The bombs that you drop, once caught in the water's drag, tend to arc and go realistically backwards. The caves, which have two entrances, can be somewhat of a problem. One entrance proves to be a dead end and results in a loss of a ship. Traveling past the Octonians is definitely the hardest part of the game since your weapons are inhibited. Although there are several places to hide along the edge of the caves, a sudden burst of tiny bubble bombs forces the Neptune back in the path of the deadly Octonians. If you can maneuver past them, fuel is available in the motionless cave.

Level two of the game is strangely upsidedown. That means the ship is upsidedown and bombs fall upwards. While it is more difficult to navigate perceptively, it is not much more difficult than level one. Level three, however, adds a shark, and the Pacman-shaped deadly bubbles reach almost the midpoint of the screen.

Overall the game is quite enjoyable to play. The graphics are excellent and smooth except for an occasional flicker of the submarine which is caused by feedback from the two paddle read routine necessary for joystick control. Although it isn't a super fast shoot-'em-up game, it has enough variety and depth to hold one's interest.

STAR CLONES

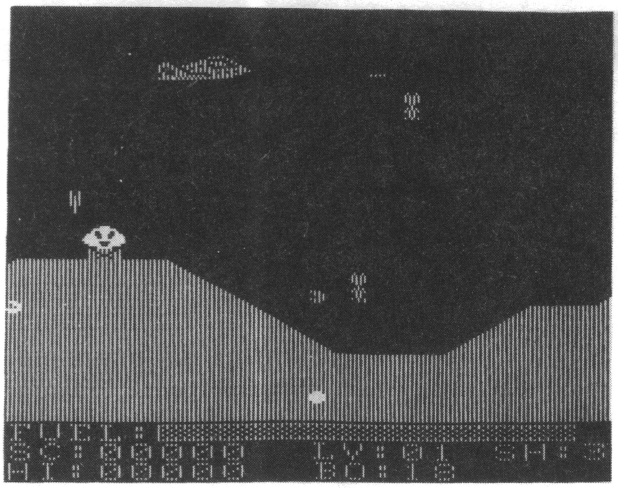
Company: Creative Computing Software
Language: Machine Language
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	C–	SKILL INVOLVED	B–	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B	VALUE FOR MONEY	D
GAME DEPTH	C–	GRAPHICS	C	HOLDS INTEREST?	D+

Star Clones is a four part shoot-'em-up space game. In round one you must defeat an onslaught of clone troopers who never shoot back. However, letting one by results in the defeat of your people. In round two, your mission is to defeat a metal monster clone with your attack ship. This strongly resembles an attack against one of the giant space walkers in the movie, "The Empire Strikes Back." The clone is only vulnerable in the head, and you must hit it as you fly rapidly across the screen from left to right while it is shooting at your ship, and slowly advancing to the left. Note that control is only in the up and down direction. In part three you must deliver a message in your land speeder to your commander. There is a dangerous ditch to jump that contains robot clones who try to collide with your speeder. This part is a variation of Stunt Cycle. You must shoot any clones that block your jump, yet adjust your speed so that you land properly. The final assault against their Star Clone City has you fighting enemy ships in space while navigating through an asteroid field.

Since the game ends rather quickly if you make one mistake, the author thoughtfully provided training missions against the clones for each of the four parts to the program. There are also a variety of levels for both training and mission modes. In sum, the game and graphics are just average; it is not exciting or involving, yet it does present some challenge.



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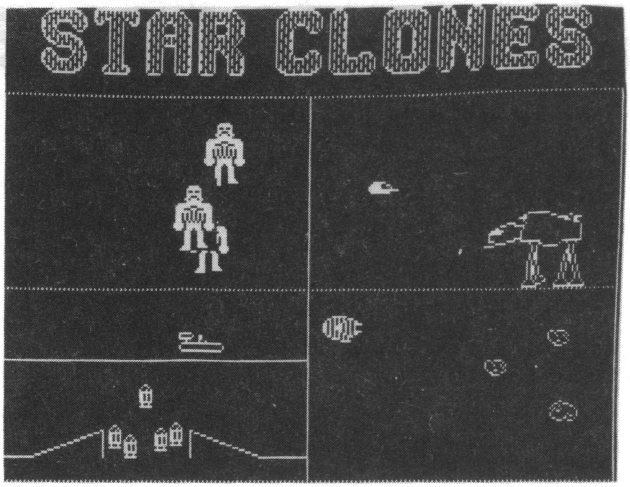


STAR CLONES

LASERSILK

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**D**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**D+**	CHALLENGE	**C–**	VALUE FOR MONEY	**D**
GAME DEPTH	**D+**	GRAPHICS	**C+**	HOLDS INTEREST?	**D**

Lasersilk is a game where a spider defends his territory or web against annoying insects and deadly bugs. These bugs, which become momentarily caught in the web, must either be captured and spun into a bundle, or be shot from a distance with lasersilk. If the bug isn't dispatched quickly, it will likely tear a piece of web off as it escapes. These gaps may likely leave your spider stranded, and prey to deadly attack spiders and the darting electrode bug. Beetles and ants that steal your bundled prey and inflict considerable damage to the web are the other dangers.

The game is played with either keyboard or joystick controls. Lasersilk fire is only left or right, so that the spider must maneuver carefully when attacking his prey. Of course, bundling is worth more than just killing, and enemy spiders aren't harmed at all by lasersilk. The game is tiresome to play, especially while trying to remember which of the ten different bugs are safe to bundle and those that are deadly. The game on lower levels is quite easy, but you can start as high as level nine. In summary, although the game has some merit, it does not hold any lasting appeal.

ARCADE STYLE GAMES

RASTER BLASTER

Company: Budge Co.
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

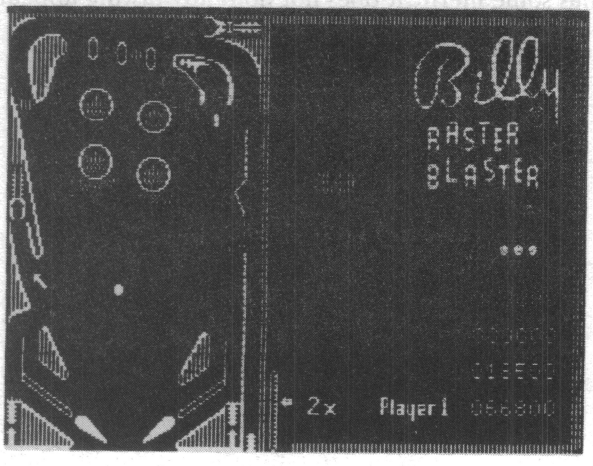
OVERALL RATING	A –	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	A	VALUE FOR MONEY	A

The sensation of playing an actual pinball machine is now available with the introduction of RASTER BLASTER. Bill Budge worked for over six months to faithfully reproduce the Bally's pinball game, Firepower. His attention to detail is astonishing. The rubber bands on the bumpers jump and the action of the claw mechanism and the spinners act like their electromechanical counterparts. Tilt has even been included for those who like to shake the machine.

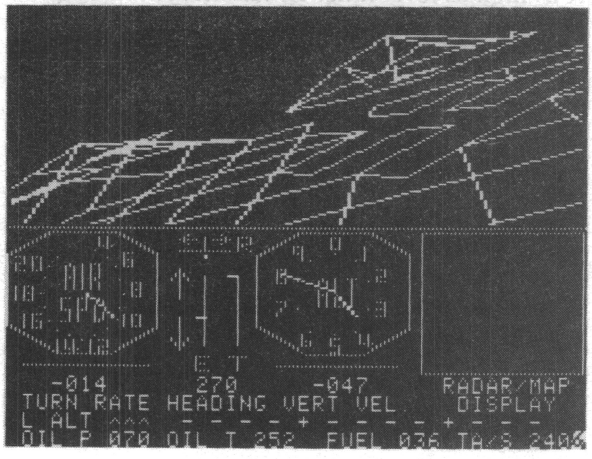
The paddle buttons activate the pair of flippers. The tilt mechanism and strength of the spring ball launcher is controlled by Paddle 0. Tilt is somewhat awkward using paddles, but works effectively on a spring-loaded joystick. The ball behaves amazingly like that of a real game. Except for an occasional freaky bounce, the ball is true. Aiming the shot is a little harder with the flippers than in the real game. Judging the strength of a shot is nearly impossible unless you trap the ball with the flipper.

The game is for one to four players with two levels of play. On "easy", the side chutes are closed, while in the "hard" mode, they close after you activate two sets of center targets. Filling all six center targets enables the RASTER BLASTER claws. Any balls shot into enabled claws are caught and the player is given another ball. If all three are caught, they are released simultaneously for multiple ball play. There are lane lights at the top, a set of targets on the right side and, of course, a spinner.

Budge's Hi-Res raster graphics are superb. He has included numerous sound effects to enhance the simulation of the newer electro-mechanical pinball machines. It is positively *the definitive* pinball game for the Apple. Hopefully, Budge will convert other popular arcade pinball games to the Apple.



RASTER BLASTER



FLIGHT SIMULATOR

FLIGHT SIMULATOR

Company: Sublogic
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Both*

OVERALL RATING	**A**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A**	SKILL INVOLVED	**B+**	DOCUMENTATION	**B**
CREATIVITY	**B+**	CHALLENGE	**B+**	HOLDS INTEREST	**B+**
GAME DEPTH	**B**	GRAPHICS	**A**	VALUE FOR MONEY	**A**

Sublogic's FLIGHT SIMULATOR is a real time, 3-D program that simulates a pilot's sense of flying a plane using the television monitor as the pilot's windshield for a visual field. The flight instruments are displayed on the lower half of the screen. The player actually flies by using keyboard or paddle controls to interact with a 3-D data set at a frame rate of between three and five frames per second. The plane follows aero-dynamic equations; thus you can land, take off, perform aerobatic maneuvers and play a wargame against a German fighter squadron. (The Germans always get it in these air combat altercations, don't they?).

The program has recently upgraded from tape to disk availability. The disk version has several added options. There is now a bombsite view for accurate visual bombs-away on the enemy fuel depot. There is also a low level altitude indicator. An often heard complaint of the tape version was that it was impossible to determine when one crashed. That has been corrected by a flashing crash sequence and a reset procedure to start several seconds later. Also, one's plane isn't slightly crippled in a dogfight, but is really demolished, spiralling into a tailspin. No breaks here. In all, an excellent program, a new standard in 3-D simulation and a deservedly popular program.

AIRSIM-1 FLIGHT SIMULATOR

Company: Mind Systems Corporation
Language: Applesoft and Machine
Hardware Requirements: 48K, paddles

Department: Entertainment
Sugg. Retail: $40.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**D**	CONTROLABILITY	**D+**	ERROR HANDLING	**D**
GAME CONCEPT	**B+**	SKILL INVOLVED	**C**	DOCUMENTATION	**A–**
CREATIVITY	**B+**	CHALLENGE	**B**	HOLDS INTEREST?	**D+**
GAME DEPTH	**C–**	GRAPHICS	**D**	VALUE FOR MONEY	**C–**

For anyone who would like the opportunity to fly the New York/New England crash corridor without leaving the safety and comfort of your livingroom chair, the *AirSim-1 Flight Simulator* may be your ticket. The author spent a great deal of time making the documentation very clear, but unfortunately failed to provide any visual references for most of the area you are meant to fly in other than the horizon. In addition, as the manual points out, you are free to fly through any obstacles that do not appeal to you.

Control is the greatest deficiency of this program. You are meant to be able to use either a self-centering joystick or paddles. The joystick was hopeless. I found that the only way to keep the plane almost stable was to use paddles. (Rumor has it that you might be able to control the simulator better if you have paddles which you can trim.) With paddles, you can at least set the roll axis at neutral, and control the climb and descent rate until you are airborne. Most disheartening is the fact that the screen is only updated once a second, so control inputs are a very delicate matter indeed. The most critical input seemed to be the turn, or roll. I found myself repeatedly spinning the plane into the ground after making only minor course adjustments.

When you exceed one of the flight parameters considered acceptable in the program, you are sent out of control and cannot recover. You must wait for the crash or press Reset. I was highly amused watching the altimeter and climb indicator alternate between almost vertical climbs and steep descents, the compass spin wildly through "1250" degrees (that's right, one thousand two hundred and fifty degrees), and the horizon situation indicator display almost back-to-back 90 degree turns. But apart from this sort of entertainment value, the program seems to be a good idea that somehow took a nosedive.

NEUTRONS

Company: Dankin5 Corp.
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**D**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C–**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**C–**	CHALLENGE	**D+**	HOLDS INTEREST	**D**
GAME DEPTH	**C+**	GRAPHICS	**D+**	VALUE FOR MONEY	**D**

Neutrons is a pseudo pinball game, actually more like bumper pool than pinball. A neutron (ball) is launched into the playing chamber by a spring release as in pinball. There are paddle-activated bumpers located at the corners and each end. These can be used to either save a ball or to speed up the action. The neutron scores points by ricocheting off the four central bumpers or by hitting target lights on the two sides. The ball can be lost as a result of bouncing through the gaps between the bumpers or through a slowly-moving hole near the field's center. This hole can be temporarily closed by pressing both paddle buttons simultaneously; the penalty for this option, however, is a thousand points. Eventually, after accumulating enough points, the neutron will split, thus giving you an extra ball in play.

The game doesn't offer the real-life dynamics of an arcade pinball challenge, nor was it designed to. The paddle-controlled bumpers take awhile to master for accurate control. Instead of the right controller activating all of the right bumpers, it activates the bottom right one, the top left one and the two corner ones situated diagonally to each other. Although the game is somewhat challenging, it isn't as fun as the pro forma pinball games designed for Apple (i.e., *Raster Blaster*, *David's Midnight Magic*, et al).

DAVID'S MIDNIGHT MAGIC

Company: Broderbund
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 9
Disk or Tape: Disk*

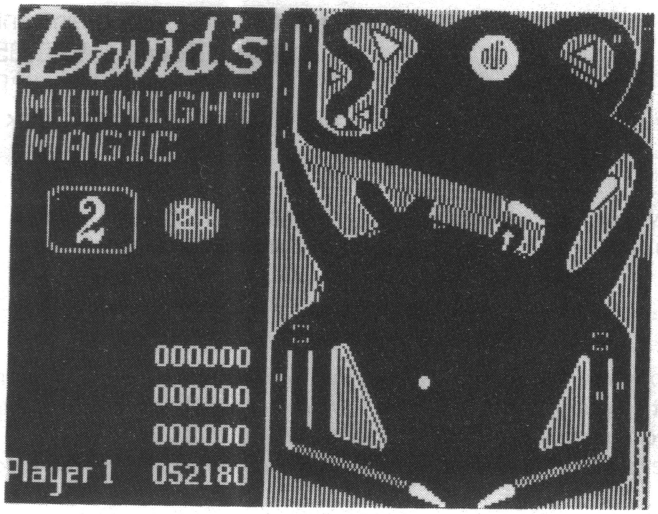
OVERALL RATING	**A**	CONTROLABILITY	**A**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A**	SKILL INVOLVED	**B**	DOCUMENTATION	**C+**
CREATIVITY	**B**	CHALLENGE	**B+**	HOLDS INTEREST	**B+**
GAME DEPTH	**B–**	GRAPHICS	**A**	VALUE FOR MONEY	**A**

David's Midnight Magic is a spectacular, double-decker pinball game. It is absolutely realistic in its approach to pinball games like *Black Knight*. These games, which have both upper and lower sections, are interconnected by ramps. There are sets of flippers on the bottom and top levels. These flippers respond as accurately as any of their electromechanical equivalents, with no erratic bounces.

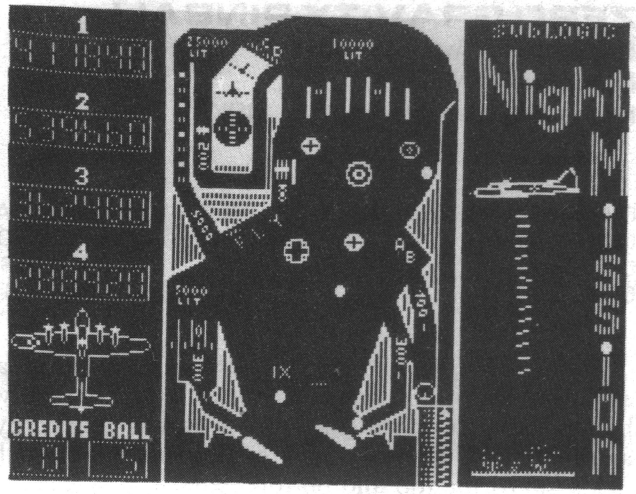
The game is action-packed, with a variety of targets included on both levels. There are various drop targets, some of which enable the Magicsave, which can save a ball that falls through at the side chutes. Unfortunately, these are activated from the keyboard, as is Tilt. This makes things somewhat awkward in use, and requires you to hold two paddles and their buttons. Other targets trigger the multiple bonus feature, or release balls that are trapped in the upper ball collector. If you can trap three balls in this S-shaped collector, all three balls can be played simultaneously. There is also a loop that connects one level to the next. This is worth extra bonus points. Kicking a ball through the loop after obtaining a 5X bonus results in being awarded an extra ball.

High scores can be saved to the disk if it is unprotected; otherwise, high scores are maintained only temporarily for the evening's play. There is also a pause control in case the phone rings; fine, if you are going for a record score.

The simulation and graphics are great. If you are a pinball fan or loved *Raster Blaster*, this game is worth owning.



DAVID'S MIDNIGHT MAGIC



A2-PB1

A2-PB1 PINBALL

Company: Sublogic
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**A**	CONTROLABILITY	**A**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A**	SKILL INVOLVED	**B**	DOCUMENTATION	**A**
CREATIVITY	**B**	CHALLENGE	**B+**	VALUE FOR MONEY	**A**
GAME DEPTH	**B**	GRAPHICS	**A**	HOLDS INTEREST?	**B+**

A2-PB1 Pinball, the most realistic pinball simulation yet to appear on the Apple, will please the hard core pinball fan. This version, called *Night Mission*, follows the classic design features of modern pinball games, yet does not attempt to copy any one machine. Overall, with its five bumpers, seven standup targets, nine rollovers, two spinners, a dive bomb chute, and a hole kicker, it makes a very exciting game. The actual layout is also well designed, with no dead spots.

Bruce Artwick went a long way in the realistic design of this game. He includes features not normally expected in a computer version, but features that are nonetheless an integral part of a real machine. He includes a quarter coin slot and start procedure for multi-player play identical to that of an actual machine. In addition, he includes the match feature for a free game. By studying and measuring the features of numerous mechanical pinball games, he concluded that there was no average set of parameters that would suit a majority of players. Thus, rather than compromise, he allows the player to adjust the parameters to suit himself.

Thirty-three individual parameters can be adjusted. The variations are so different that ten of the modes are preset with easy access by setting only the mode number in the FIX mode. Others that the user can specify can either be set for one time play, or be saved to a separate disk. (One mode and one high score on a disk.) For example, you can vary the impulse and time delay of the hole kicker, the tilt sensitivity (yes there is tilt triggered by the keys on the left and right side of the keyboard), ball speed and trails, bumper impulse, flipper power, spinner friction, and forward incline of the machine. There are others that affect the sound and the scoring. One adjustment called "ball trails" gives a "cosmic effect," in which the ball appears as a slinky as it bounces around.

You can hook up for sound with either the Apple's small speaker or by running the cassette output port to your stereo. The sound effects are very good in this game. Sounds range from the sound of an airplane engine, to high pitch whistles and explosions. After all, this game follows the theme of a B-17 on a night mission over Japan where various cities are the targets. That is why the game's layout includes a bomb release line (vertical chute), and a dive bomb chute (U-shaped tunnel with a spinner at the end).

The graphics are stunning and rich in fine detail. There is a considerable amount of fine, detailed writing on the playfield that shows up clearly on a color monitor, and doesn't interfere with the drawing of the ball.

While it is hard to judge a particular setup for ease of play, many of the preset modes act, and more importantly *feel*, as if one is playing a real game. I personally didn't like the play of the competition mode because it felt like the machine was almost playing by itself with its high speed ball and strong bounces off the kicker. However, the easy mode and medium difficulty modes were realistic. One nice feature that has been lacking on other simulations and works as expected, is a still or quiet ball held by an activated flipper. I know many people who complained about balls that oscillated in other pinball versions. The balls appeared as if they were about to escape from the flipper.

In summary, I should say that *Night Mission* is the most versatile of all the pinball games for the Apple.

ZERO GRAVITY PINBALL

Company: Avant-Garde
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C	CONTROLABILITY	C–	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	B–	CHALLENGE	B+	VALUE FOR MONEY	C–
GAME DEPTH	C	GRAPHICS	C	HOLDS INTEREST?	D+

Zero Gravity Pinball offers a rather unusual approach to what is known as the normal pinball game. This version, as the name implies, has no gravity effects. It is equivalent to playing pinball on a flat surface with no friction. Any ball escaping from the playfield, which is defined by hard corners and dotted lines covering most of four sides, is automatically lost. A series of ten flippers, five on each side, guard the two sides, while two keyboard-activated force fields guard the top and bottom.

The trick to this game is that only one of the flippers activates at any one time. The choice is made by paddle control. As you rotate the paddle, each of these flippers turns red in sequence and becomes active. This change is represented by a black dot on the flipper on a B & W monitor. Flippers that aren't active can't stop the ball. Occasionally the center bumper becomes a sink hole. The force shields that prevent the ball from exiting top and bottom are activated by different keys: space bar for bottom and any other key for the top.

The big question is how does a person handle this many controls without having three hands, especially when the ball speeds up on more difficult levels? With difficulty! While the game concept is fine and there is a definite challenge requiring considerable practice, the average person has trouble holding a paddle with two hands while using the keyboard simultaneously in a real time environment. The game would have been better suited if the controls were transferred to a two switch, non-spring load joystick. The graphics are colorful yet they don't have the smoothness of some of the more conventional pinball games. But the game is worth buying if you like pinball, yet are tired of the conventional game.

DUELING DIGITS

Company: Broderbund Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	C+	CHALLENGE	B	VALUE FOR MONEY	C+
GAME DEPTH	C	GRAPHICS	C	HOLDS INTEREST?	B

Dueling Digits can be classed as a thinking game, yet at the same time it may be a subtle way to introduce children to the world of mathematical equations. It is basically a game for two competing players in which the object is to capture mathematical symbols (+ = signs) and single digit numbers, and arrange them into a viable expression such as 6 + 3 = 9 or 5 – 2 = 3. Each player controls a ship, or scrab, on opposite sides of the screen by paddle control. The numbers and operators are in constant motion between them and constantly changing in value. A player captures one by shooting at it, then depositing it on the expression line at the bottom of the screen.

The challenge isn't only in gaining credit for a correct mathematical expression, but in simultaneously defeating your opponent either by shooting him directly or by stopping him with a shot while he is returning with his prize number. This game isn't as easy as it sounds, for you often shoot an unwanted digit and must deposit it down the garbage hole. Or you can make an error on the equation line, and have to erase and start fresh.

The game turned out to be more involving to the children and teenagers who tested it than one would have ever expected. Normally kids are completely turned off to games that hint at any educational value, but this game was so carefully disquised as a shoot-'em-up game that they immediately became involved. Although it could never be classed as an "addicting game," it is certainly fun. The game does have a one player practice mode. The computer opponent doesn't try to form expressions, but hinders your attempts and is a surprisingly good shot.

VOYAGE OF THE VALKYRIE

Company: Advanced Operating Systems
Language: Applesoft
Hardware Requirements: 48K Apple II/II +

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	**D+**	CONTROLABILITY	**D**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B–**	SKILL INVOLVED	**C+**	DOCUMENTATION	**B–**
CREATIVITY	**D+**	CHALLENGE	**B**	HOLDS INTEREST	**C**
GAME DEPTH	**B–**	GRAPHICS	**C**	VALUE FOR MONEY	**D+**

This program is essentially a b & w, Hi-res shoot-'em-up. The scenario is played out on an 8x10 grid map. The player moves from one location to another, seeking out up to ten castles which are defended by various types of birds. The number of birds is randomly selected within a range determined by the skill level chosen.

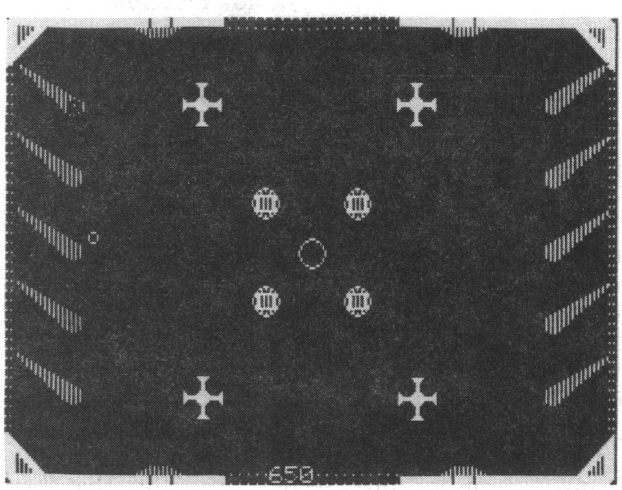
To avoid being killed, the player has to be concerned about; running into solid objects (mountains, castles, etc.), overall fuel levels (which can be replenished at base castles), the shield energy level (which protects the player during combat), and the birds (which shoot back). As each castle is captured by zapping the birds, the player's rank is elevated up to a limit of eleven levels and the amount of gold to be captured is increased. Upon reaching the rank of colonel, the most threatening birds tend to be attracted to your location. Destruction of these winged predators result in winning the game; the final score is determined by the amount of gold collected.

Primary control of the program is accomplished by the use of a joystick or paddles. For movement from one location to another, the player selects a direction (N, S, E, or W) and presses the button.

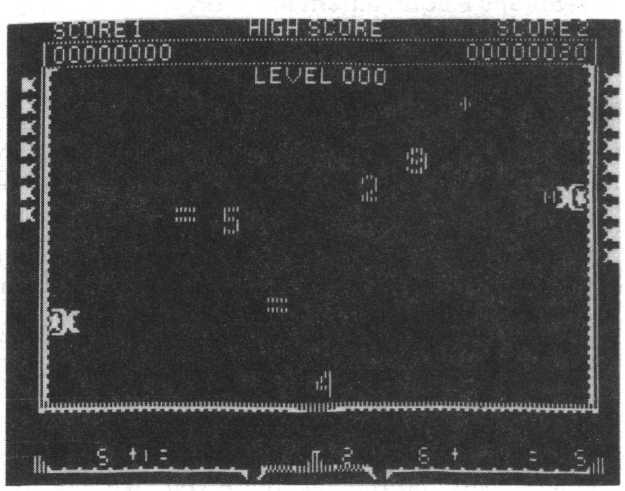
During combat, joystick or paddle control is used to aim a crosshair (–) at the aviary targets, which can glide downwards or flap wings in order to rise to the top of the screen. Each castle contains one of five types of birds, all of which, unfortunately, look alike. However, the types of birds within a specific castle are the same, with their capabilities known in advance. The number of birds appearing at any one time is displayed at random. Frequently, targets are superimposed over either one another or a castle, making it very difficult to differentiate between the vulnerable points (head and chest). Aiming of the crosshair device is very difficult and movement is not smooth by similar competitive games' standards. Control is more difficult using the paddles. Due to the fact that this is the primary activity in the game, play becomes frustrating.

The program is an excellent demonstration of the computer's ability to generate organ-like audio effects. Selected musical segments from Wagner's "Ride of the Valkerie" are played during various games phases. The documentation content is easy to understand, as is the rule booklet, which is graphically excellent. One error message (OUT OF MEMORY) occurred several times in a row when reloading saved games. Recovery was simple and effective. Regarding graphics, the primary bird images are finely-drawn and smoothly animated.

Overall, this is a challenging contest made doubly so by the difficulty in using the paddles or joysticks effectively. Possibly, this survival test should best be left to a Rod Taylor or Tippi Hedren to conquer as a tribute to their Hitchcockian experience.



ZERO GRAVITY PINBALL



DUELING DIGITS

SWASHBUCKLER

Company: Datamost
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	N	DOCUMENTATION	B–
CREATIVITY	B	CHALLENGE	B	VALUE FOR MONEY	B
GAME DEPTH	C	GRAPHICS	A	HOLDS INTEREST?	C+

Swashbuckler brings the romantic flair of sword fighting to the Apple screen. The encounter takes place aboard the most wicked pirate ship ever to sail the seven seas. You have to fight your way from deck to deck past a whole crew of motly pirates, evil villains, poisonous snakes, and trained killer rats.

You start with three lives and a trusty, silver sword. Using keyboard controls, you can maneuver your man back and forth, turn him around, and manipulate your sword with lunges, thrusts, and parries. Two villains surround you on each level, with each succeeding deck offering more of a challenge. A villain slowly inches closer from behind as you drive the other back with repeated lunges and thrusts. The villain raises his weapon for the kill just as you make a fatal lunge through his chest with your sword. You turn just as a large trained rat goes for your leg. A quick, low parry killing the vermin enables you to face the other pirate before others arrive to take the dead man's place.

After killing twenty pirates, you advance to a tougher set, and to a higher deck until you eventually reach open air. After 25 dead, you are awarded a new life. The villains on the first two levels are overweight clods and easy to beat. When you get to the real swashbuckling types, the game gets harder.

The keyboard controls are relatively easy to master. The A and D keys move your figure left and right while the S key turns him around. The I, J, K, M keys control parry high or low, on guard and thrusting. Since the game is slow paced, you rarely foul up with the keys. With no perceptible keyboard lag, the game's response seems realistic. When you think you have penetrated, your opponent falls. The graphics and animation are first class and many people will buy the game for these qualities. But the game does get repetitious with continued play. A high score, which is always saved to disk, encourages players to beat their previous record. Although the score has room for a five digit number, skilled players have mentioned that the score wraps back to zero after 255. This may have been fixed since we received this copy.

GOLD RUSH

Company: Sentient Software
Language: Machine Language
Hardware Requirements: 48K

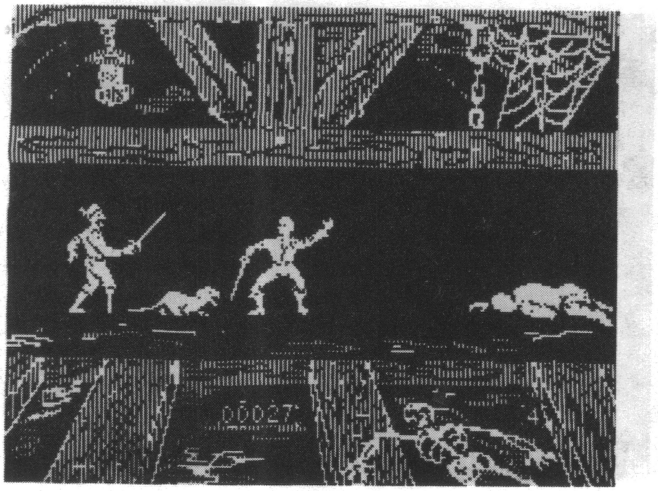
Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	D+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	D	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C–	VALUE FOR MONEY	D
GAME DEPTH	C–	GRAPHICS	C	HOLDS INTEREST?	D+

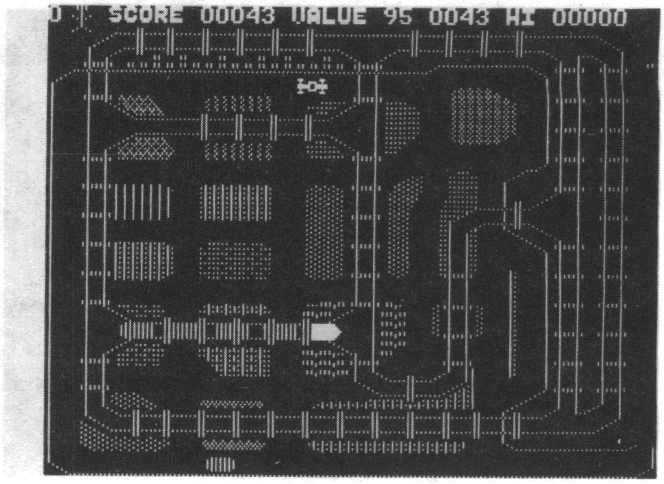
In *Gold Rush* you play an 1849 miner who just came West on the train. The object is to snag a stick of dynamite lying on the ground and take it through the forest to one of the four mines at the left side of the screen. However, there are hostile Indians, a bear, and a claim jumper that are out to get you. The claim jumper only steals your dynamite, the others kill you. You have only three lives, so be careful.

Once you have staked claims to all four mines, you advance to another four. After mining them successfully and sending your gold back on the train, you advance to the timed bonus level. By this time claim jumpers have heard of your success. Three are waiting for you.

The game is simple, yet cute. The graphics are so-so. At first, the game seems difficult as you seem to frequently run into bears and Indians. But if you take time to watch the enemy patterns for thirty seconds, you'll see that they are roughly circular, so that it just takes timing to stay clear of them. Essentially, most players will find the game unchallenging and will become bored with it quickly. It is a good child's game, but not up to arcade standards.



SWASHBUCKLER



TRACK ATTACK

TRACK ATTACK

Company: Broderbund Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

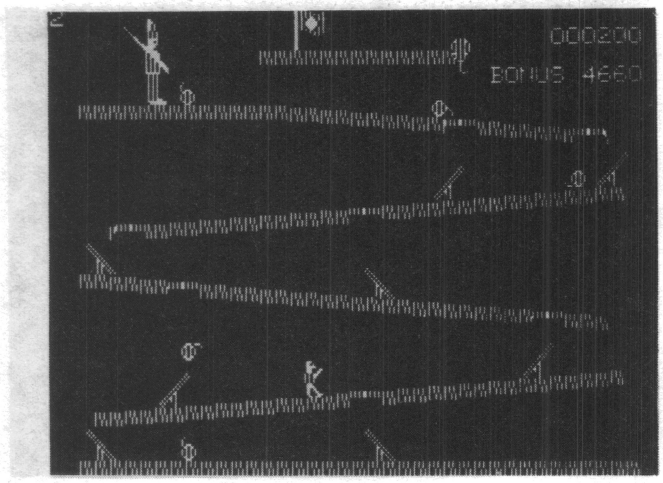
OVERALL RATING	**D**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C–**
CREATIVITY	**D**	CHALLENGE	**C+**	VALUE FOR MONEY	**D**
GAME DEPTH	**D**	GRAPHICS	**C**	HOLDS INTEREST?	**D**

Track Attack's game concept is both novel and challenging. Picture a railroad switching yard where a train is shuttling gold loaded at the freight yard's depot. You, the train robber, have a souped up 1982 Pierce Apple that is capable of ramming the side of the train's boxcar. The trick is to catch the train as it passes a road crossing, ram it, and make off with the gold. You must deposit it at your storage area at the lower right on the screen. It sounds simple, but I forgot to mention that a night watchman patrols the freight yard in his green 1952 DeSoto. If he catches you, you are a dead man. He shoots first and asks questions later.

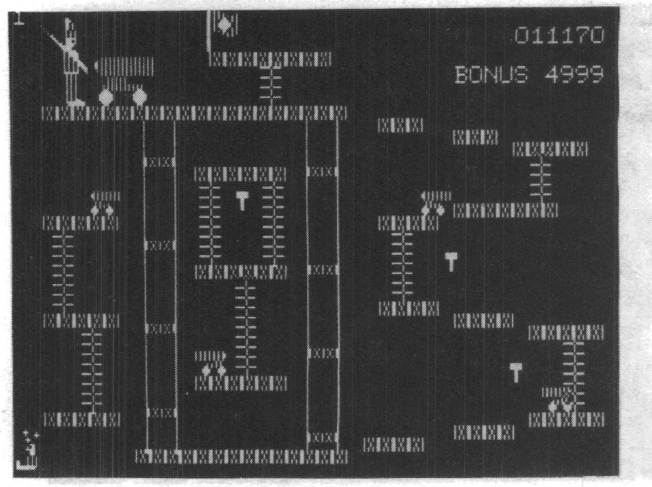
This watchman is a sneaky devil. He sometimes discovers your gold and attempts to take some of it back to the depot. If he succeeds, you lose the value of that gold plus a penalty of 100 points. However, you can try to steal it back by ramming into him. You can reach bonus levels by aligning your car with the train as it heads north on the track on the screen's left side. At that point you press a button (if your playing with a joystick), or the space bar (if on keyboard controls), and you jump on the train.

Jumping and running from car to car in an attempt to gain control of the engine is actually easier than it at first appears to be. The animation in this segment is superb. The thief jumps and summersaults from one car to the next. When he has control, the game advances to level three. This is a bonus level. The train robber, in a twist of fate, tries to recover eleven pieces of gold scattered on the tracks. He steers the train while the night watchman attempts to prevent the train robber from collecting all of the scattered gold by derailing the train.

As cute and novel as the game is, it suffers from a somewhat crazy control system. It is impossible to reverse the direction of your car, and turns must be executed well in advance of an intersection. If you don't make a turn, the car's steering automatically goes into a series of default turns. Thus, your car appears to be on some random course irrespective of your desired goal. Add this to the randomness of the night watchman's car and a somewhat random train, and the game appears to be playing by itself. Beginners' scores don't appear to improve when they are steering their car or when they aren't. There is no doubt that this game takes getting used to regardless if you are playing by keyboard or joystick control. Despite the excellent graphics and game concept, this is not likely to catch on with the general public.



CANNONBALL BLITZ



CANNONBALL BLITZ

CANNONBALL BLITZ

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**B+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**B+**	DOCUMENTATION	**C–**
CREATIVITY	**B+**	CHALLENGE	**A**	VALUE OF MONEY	**B+**
GAME DEPTH	**B+**	GRAPHICS	**A**	HOLDS INTEREST?	**B+**

Cannonball Blitz is a clever takeoff on the popular arcade game *Donkey Kong*. The object is to capture the enemy flag at Cannonball Castle on the third level of the game. This is a formidable task since you must first scale multi-tiered Nutcracker Hill where cannonballs continually roll down. If you're skillful you can jump them, or take advantage of one of the seesaws that can propel you upwards to the next higher platform when a cannonball drops on the opposite end. Then there is the balloon that appears occasionally and holds the key to success or failure.

Level two tests a combination of your coordination and deductive power. Obviously, there is some pattern to avoiding the cannon on each level of the platform. Although you can leapfrog a moving cannon, and there use a hammer near the top that will help you destroy them, these cannons are able to shoot as well as climb or descend ladders. If you can manage to knock out all of the pins that hold the entire structure together by running across them, the guard that patrols the entrance to level three will fall to his death.

The third level (like the arcade version's) is a Rube Goldberg contraption of continuously moving elevators, one up and one down, that connect a series of platforms which you have to leap between. Perfecting the timing required to make the leaps would be difficult enough for some players, but add several cannons chasing you up and down ladders, and cannonballs bouncing down the stairs, and you have a nearly impossible situation.

The game is certainly challenging and, like an adventure game, requires trying numerous combinations until you find a pattern that gets you by a certain obstacle. Like the arcade game, it takes a lot of practice, and a feeling that whatever you did wrong was just a fluke, and you'll get it right next time. Yes, it's addicting.

The game's graphics and animation are smooth and professional. Control is either by keyboard or joystick. A spring loaded joystick is recommended. However, the settings shown in the instructions for the TG Joystick are wrong. If you center the trim pots, your man will always move to the right when you let go. Falling off the platform in these situations costs you a man. Adjustment should be made to the far left. The same is true for up and down motion, or you will have trouble climbing ladders. The push button causes your man to jump. In summary, the game is clever, well execututed, has depth, is addicting and fun to play.

COPTS & ROBBERS

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C –	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C +	SKILL INVOLVED	C –	DOCUMENTATION	B –
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C –
GAME DEPTH	C	GRAPHICS	C –	VALUE FOR MONEY	C –

COPTS & ROBBERS is a Hi-Res treasure-hunt game played out in the mazes beneath a pyramid. The object is to escape from the pyramid; however, this requires first finding four jewels and a precious vase, and then returning them to the vault room. They are normally buried in the coffins of dead thieves, but some of these coffins actually contain killer mummies. A key is required to open the coffin; a mummy may then spring forth and attack you. Fortunately, if you have a killer stone in your possession, you can zonk the crazed thing. Unfortunately, you can only carry one item at a time. There is also a ghost located on an advanced level that steals the items you are carrying and frequently deposits them in the walls of various rooms. Definitely a strange-acting kind of spectre. However, with the aid of a nifty little magnet you may have acquired, you can regain possession of these items by pulling them out of the walls. A neat trick. Indiana Jones would do cart-wheels over this!

The game has a very well-thought-out scenario. On the lowest level it makes an excellent children's game. On this level the maze is relatively small and remains the same for all games. It consists of four screens by four screens, with a wrap-a-round feature. The graphics are somewhat rough and simplistic, although the objects – other than you (a dot) – are drawn in Hi-Res shapes. Movement is keyboard-controlled, using the arrow keys and the A and S keys. A single key press moves your dot a tiny distance, while a double press keeps you moving in that direction until stopped by another key. The space bar is used to pick up and drop objects.

Advanced levels of the game feature a larger maze, which tends to have many identical rooms that will cause you to founder about and lose your bearings. The intricate design of the maze sections require too many keystrokes to negotiate corners rapidly while being chased by a mummy. A reasonable solution, especially for children, would have been to allow the player a choice of using a joystick or the keyboard. And about the ghost . . . since it invariably steals whatever you are carrying or whatever is in the room you are occupying, it is nearly impossible to carry an object very far before that klepto wraith lifts it from you. Bad news!

Since it becomes very frustrating to achieve even part of your objective in a reasonable amount of time, children will tire of this hunt very quickly. Although adults have more patience, it probably is not a game that they would enjoy. In summary, if a child sticks to the lowest level, it will provide a very pleasurable challenge. And if an adult can overcome the effrontery of that pack-rat, absconding ghost, there's a possibility of wending your way through the advanced levels with the loot and surviving (no mean feat!).

SHUFFLEBOARD

Company: Innovative Design Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	C +	ERROR HANDLING	N/A
GAME CONCEPT	D	SKILL INVOLVED	D +	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	D +	HOLDS INTEREST	D
GAME DEPTH	D	GRAPHICS	C –	VALUE FOR MONEY	D

SHUFFLEBOARD, a game usually played on the decks of ocean liners, has come to the Apple system. It consists of a Hi-Res contest in which two players, alternating turns, shoot a puck down a playing court using a cue with the object of landing on numbered spots. The players have a choice of trying to score themselves or knock their opponents' puck off the court. The package includes the "Tally All" or "Cutthroat" versions of the game.

One or two players can compete against the computer. The court is non-standard in its perspective dimensions. The first to score fifteen points wins. One adjusts the cue angle with the U and D keys, then presses the space bar to zip the cue across the board. A moving asterisk at the bottom of the screen determines the speed of the shot. This is done by pressing the S key in conjunction with the position of the asterisk. It isn't very precise, since there is a lag time in the response.

The computer can assume the role of the opponent on either one of two difficulty levels. Innovative design has intentionally attempted to make the computer's game imperfect; otherwise, it could always win. As a sports game, SHUFFLEBOARD is not very exciting and somewhat a disappointment as implemented on the Apple.

POOL 1.5

Company: Innovative Design Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	B+
GAME CONCEPT	A–	SKILL INVOLVED	B–	DOCUMENTATION	B
CREATIVITY	B–	CHALLENGE	B	HOLDS INTEREST	C+
GAME DEPTH	B	GRAPHICS	B+	VALUE FOR MONEY	B

To simulate the game of pocket billiards accurately with 15 balls and a cue ball bouncing around the table in real time is an incredible feat. The programmer's attention to detail is to be commended. He offers variable friction, strength of shot, type of English on the ball, and four types of pool (straight pool, eight ball, nine ball and rotation).

On the break, or after one's opponent has scratched, one can place the cue ball into position for the shot. Aim is accomplished by a paddle control. A dotted line with the shape of the cue ball's position against the target surface (ball or cushion) is moved about the table. Once a target is chosen, control can be shifted for a finer aim before the shot is taken. While there is a lot of fine adjustment for timing during close shots, it is somewhat less accurate for shots across the table due to the geometry of the problem.

Those who play pool regularly will find the dynamics or physics of the game amazingly accurate. Balls strike and bounce off each other according to Newton's laws of motion. By adding a choice of nine types of English for a shot, one can control the final resting position of the cue ball as in the real game. A nice feature is that if one is practicing a trick shot and misses, the shot can be tried again with all balls in the same place.

The graphics, which are excellent, can be used on either a color or black and white screen. One can toggle between showing the balls with their numbers or in two colors. Actually, on a black and white screen, the colors show up as stripes and solids depending how good your monitor is. The game's instructions can always be reached by toggling the ESCape key. The game comes with a demo mode, with which you can break with the friction set to 1 (minimal). The balls seem to bounce around forever until almost every ball is sunk.

TRICK SHOT

Company: Innovative Design Software
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	B–	DOCUMENTATION	B–
CREATIVITY	B–	CHALLENGE	B	HOLDS INTEREST?	C
GAME DEPTH	B	GRAPHICS	B+	VALUE FOR MONEY	C

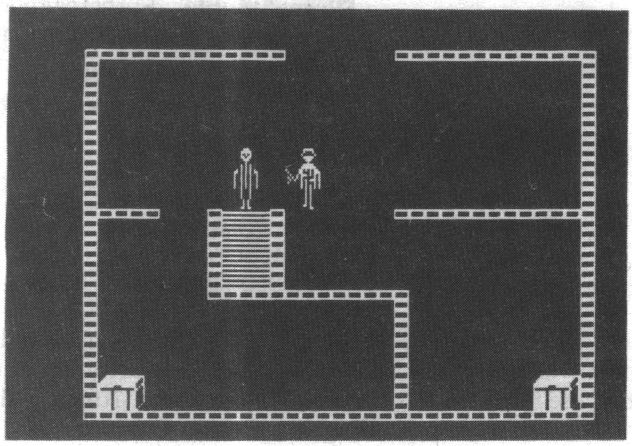
Trick Shot is the sequel to *Pool 1.5* by the same authors. It does not offer the same games as the original, but includes Snooker, Billiards, Three Ball, and a special game called Trick Shot. The Trick Shot game is the reason you buy this package. It allows you to position as many balls as you like before each shot. This permits you to place six balls like the professionals do, which carom into each of the side pockets when hit by the cue ball. Or, you could set up some bizarre shot that would have one ball carom off another in an almost endless procession.

The balls are postioned in a setup mode. Each ball is initially positioned with the U, D, right, and left arrow keys. Previously positioned balls can be moved or removed. What's exciting about this mode of play is that once the shot is taken, and if it doesn't work properly, you can press the R key and all of the balls are put back in their previous positions. A slight adjustment can then be made, so the trick shot will hopefully work.

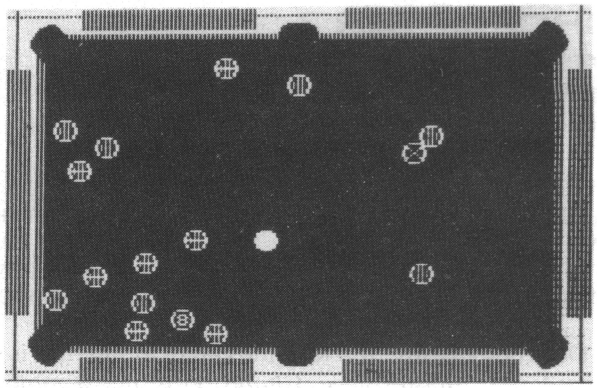
There has been a change in the aiming controls for the cue ball. They now work for either paddles or keyboard. You can switch back and forth with the CTRL-K key. The fine aim now has the accuracy of a single pixel position. Unfortunately, the extra precision is indicated by a projected path that doesn't begin at the cue ball's current positon. It is very confusing, especially when the cue ball takes a jump while traveling toward the target. This is not very realistic.

The game comes with an extra disk that contains sample, impossible trick shots. These can be loaded by simple keyboard commands. In fact, you can save any of your trick shots to a specially formatted disk for future replay.

Setting up trick shots is quite a bit of fun. Users should be aware that setting up symmetrical shots doesn't work properly. For some reason, possibly round-off errors during the calculations, symmetrical shots do not produce the outcome you'd logically expect. But they are close, so it is nothing to worry about. It will just take more work to set up a good shot. The game is a pleasure for pool fanatics; otherwise just stick to the original *Pool 1.5*.



CASTLE WOLFENSTEIN



POOL 1.5

CASTLE WOLFENSTEIN

Company: Muse
Language: Applesoft ROM
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**A –**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A**	SKILL INVOLVED	**B**	DOCUMENTATION	**B –**
CREATIVITY	**A –**	CHALLENGE	**B**	HOLDS INTEREST	**B +**
GAME DEPTH	**A**	GRAPHICS	**B +**	VALUE FOR MONEY	**B +**

CASTLE WOLFENSTEIN is the first game to combine an adventure scenario with a real-time, arcade-type game. The Germans are holding you prisoner in the dungeons of Castle Wolfenstein. A dying cellmate gives you a gun and ten bullets. The object is to find the war plans for Operation Rheingold and escape from the castle.

As one wanders from room to room, one encounters various chests, patrolling guards and, sometimes, SS storm-troopers. Some of the chests contain items you need; a German uniform, a bulletproof vest, and, at times, even ammunition. The chests require time to open. You can replenish your supplies by searching the dead guards.

Your protagonist is controlled by either keyboard, paddles or joystick. The joystick provides the best control method. Your player can be directed with ease with the joystick and, if it is self-centering, your player will stop when the joystick is let go. When button #0 is pressed, the joystick aims the gun. Button #1 is used for firing. Keyboard control is similar; however, it uses two groups of nine keys. The center key of the block of movement keys stops motion. The problem with the keyboard control method is that you must make sure your fingers are always in the right position. If you don't press the stop key quickly, you will crash into walls. Paddle control is simply a disaster. Apparently, Muse has calibrated their game to work with a particular paddle. You're supposed to be able to judge the direction of movement by marking the paddle. With both the TG and Apple paddles, it doesn't work. Turning them very slightly shifts movement from straight-up to diagonal-right. Consequently, one is always going the wrong way; this is frustrating in a real-time game.

The game is quite good and fun to play. There is some sound implementation for the guard's voices — German vocabulary, of course. There is variety in this game, too, although the castle layout will stay the same until you escape or you choose to generate a new and random castle before escaping. This gives you a chance to learn or map a particular game. If you win and advance in rank, the difficulty factor increases.

CHOPLIFTER

Company: Broderbund Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**A+**	CONTROLABILITY	**A**	ERROR HANDLING	**N/A**
GAME CONCEPT	**A+**	SKILL INVOLVED	**B**	DOCUMENTATION	**B**
CREATIVITY	**A**	CHALLENGE	**B+**	VALUE FOR MONEY	**A+**
GAME DEPTH	**B**	GRAPHICS	**A+**	HOLDS INTEREST?	**A+**

Occasionally an arcade game comes along that is so unique, so well executed, and such a joy to play that it can be considered a masterpiece. *Choplifter* is such a game. The game involves flying a helicopter into the desert in order to rescue sixty four hostages held prisoner in four barracks. One of the barracks has been blown open and sixteen of the prisoners are waiting patiently for your arrival. Unfortunately, tanks are patrolling the area so the hostages are reluctant to stray far from the burning barracks.

Your helicopter (there are three) is warmed up on the heliport next to the post office near the border. The helicopter responds to the up, down, and sideways movements of the joystick. Although helicopters can fly backwards in a limited fashion by pitching the direction of the rotating blades, control is provided for turning the helicopter around in order to aim its guns. Holding button one down reverses direction, and pressing it momentarily puts it into tank attack position directly facing you on the screen. The helicopter is easy to fly, and impossible to crash on level one.

It is important to set the helicopter down as near to the prisoners as possible without landing on one. The shorter their run to the copter the better, for tanks are always moving up on your position, and you often have to make a quick getaway. It is always best to destroy a tank quickly, but first lure it away from any prisoners still on the ground, for they are often killed by exploding shells.

The animation in these sequences is incredible. These prisoners actually run towards your chopper. The chopper's blades are rotating and the craft is bouncing slightly as if you were gunning the engine in anticipation of a quick takeoff. As the moving tanks lob shells closer to your craft, the exploding shells sometimes kill a running prisioner. When the prisoners are aware of your leaving, or if your chopper is full, they wave goodbye. There is detail in their motion as they run after your hovering helicopter, or as they run from an advancing tank. You'll watch in amazement as your helicopter is hit by an enemy shell just after it lifts off and it turns into a ball of fire and descends as flaming wreckage.

After rescuing as many as sixteen hostages (the copter only holds sixteen), you return to your base and the second level of the game begins. Enemy jet fighter craft guard the airspace above your advancing craft. They turn and bank sharply while firing rockets at your chopper. Sometimes it is best to maneuver into position and try to shoot them down. Just flying along is like being a sitting duck. A quick attack on a barracks usually frees another group of hostages. Rescue is more difficult at this point as missiles can still hit you from above. The only consolation at this point is that enemy aircraft stay on their side of the border. However, on level three, enemy drone air mines that are capable of homing in on your craft don't care what side of the border you're on.

The helicopter is extremely easy to fly. You do have to be more careful of your descent rate on the upper levels or you will crash the copter. The maximum score is obtained by rescuing all sixty four prisoners. Since this is a formidable task, I would consider this a very challenging game. Overall, the concept, graphics, and animation make this a delightful game. If you are seeking something novel and a game that doesn't quickly bore you, then buy *Choplifter*!

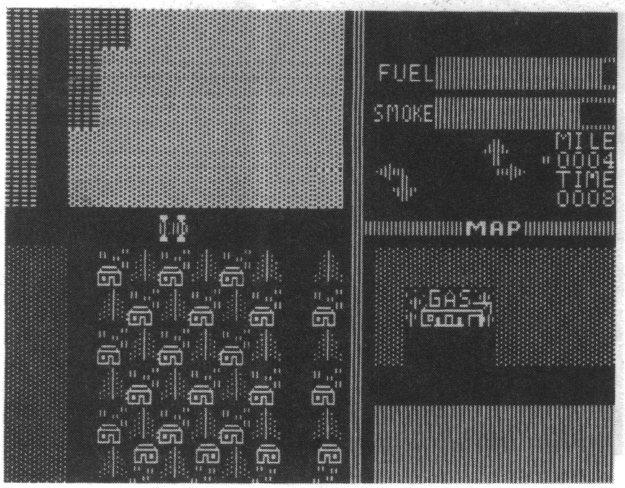
PIGPEN

Company: Datamost
Language: Machine
Hardware Requirements: 48K

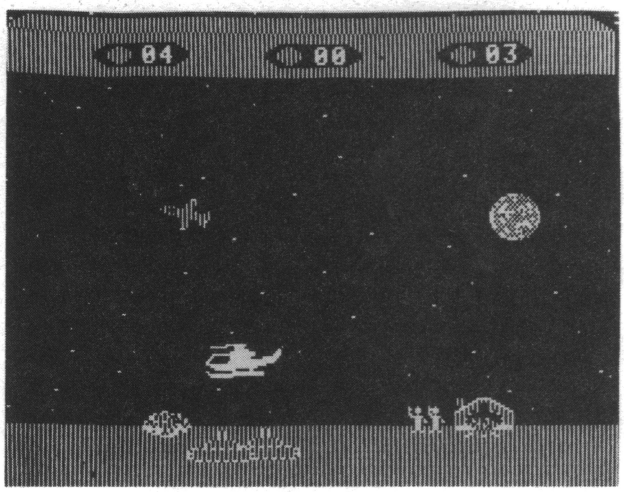
Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**D**	CONTROLABILITY	**C**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**D**	CHALLENGE	**C**	VALUE FOR MONEY	**D**
GAME DEPTH	**D+**	GRAPHICS	**C**	HOLDS INTEREST?	**D**

Pigpen reverses the eat the dots strategy in maze games by having the player guide a man who puts the dots down instead. Instead of ghosts, as many as eight pigs scurry around the maze in pursuit. The game is just an unimaginative variation of *Pacman*. The pigs, fortunately, don't track you very well: at the speed they run about the maze, you are lucky just to have a near miss.



CROSS COUNTRY RALLYE



CHOPLIFTER

CROSS COUNTRY RALLYE

Company: Continental
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

Cross Country Rallye is a road racing game in which the object is to navigate a course past eight checkpoints in the fastest time. The course, which includes forest, desert and city terrain, encompasses a large number of screens and scrolls roughly with the direction of the car. Three "jam" cars also are on the course. They attempt to crash into your car, but you can expell a smoke screen to get them off your tail. Also, since your racing car uses a lot of fuel, there are a number of gas stations on the route where you can replenish both fuel and smoke.

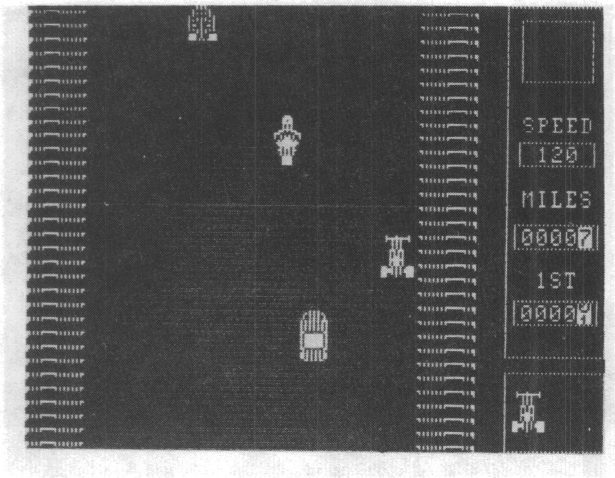
Modeled after the arcade game *Rally X*, this game has gone through a number of changes since the original release. As they say, too many cooks spoil the broth, and this game is not an exception. The original version was uncontrollable, and the distributor's attempt to "improve" the game did more harm than good.

The original version had a crude overall map that showed the positions of the flags and jam cars. However, there were so many dead ends and cul-de-sacs it wasn't easy to steer from one checkpoint to the next. (Remember that you can only see a portion of the enlarged course at any one time.) But the paddle and keyboard controls were unresponsive. Players often became permanently trapped in cul-de-sacs.

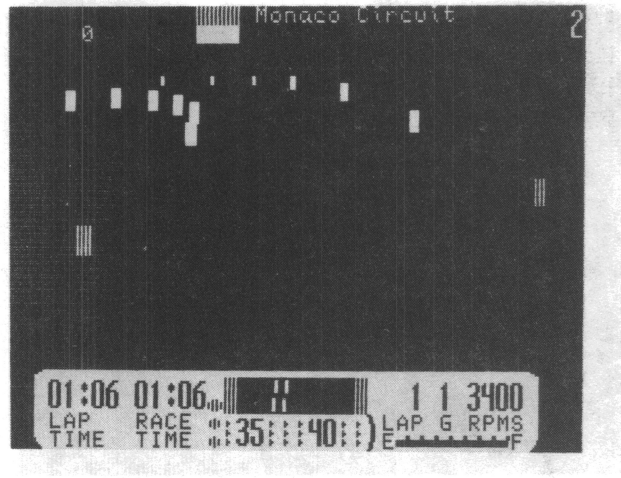
In the new version they added a joystick mode to the controls, which isn't too bad for control, especially at low speeds when using a spring-centered stick. The speed control is operated with the number keys. You can escape from a cul-de-sac at speed 1, but not at higher speeds. Paddle control is unusable. One paddle controls direction, but you are never sure where center is, and its button reverses direction. The other paddle controls speed and smokescreen. Keyboard control is recommended. The arrow keys make the turn, the / makes the car go straight, space bar reverses direction, and the ESC key releases the smoke screen. No matter what the control mode, you have to give orders well before the turn in order for the game to respond. Thus you often miss turns and sometimes don't even get out of the starting block properly.

The map was replaced with a mini map that centers on your position when the C key is pressed. It is the same scale as your playfield, and thus requires scrolling with the I,J,K, and M keys. This might be fine in a tactical game, but this is a real time game with jam cars on your tail. Besides, you can probably drive faster than you can scroll the map. The location of the next checkpoint is shown at the top of the screen by a set of arrows. That isn't too bad in a game lacking a road map, but this method is also used to indicate an approaching jam car via another set of arrows. Since you can't tell that the cars have split up in the chase, you suddenly see one, reverse direction, swoop down the next road, and find that you are trapped. Although the first car has turned around, you can't pass a smoke screen until it dissipates later in the game.

The graphics are not smooth. Scrolling is very rough. A game like this is very hard to do on the Apple, and it needs a computer that can fine scroll like the Atari. Overall the game is hard to control and play. Yes, it offers a challenge in a frustrating way, but most people will tire of it long before they gain any proficiency.



AUTOBAHN



INTERNATIONAL GRAND PRIX

AUTOBAHN

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C**	DOCUMENTATION	**C+**
CREATIVITY	**C–**	CHALLENGE	**C**	HOLDS INTEREST	**C**
GAME DEPTH	**C+**	GRAPHICS	**C**	VALUE FOR MONEY	**C**

AUTOBAHN employing NASIR's vertical scrolling technique is the most visually exciting race car type game available for the Apple. It is a one player version wherein one attempts to drive three expendable cars against the traffic down the Autobahn as far as one can go. While not very realistic, since the oncoming traffic doesn't attempt to change lanes, it does offer a challenge. Your car, placed midway down the screen, is steered side to side by either paddle or keyboard control. With three speed levels and a variety of obstacles, including a firetruck, oil slicks, night driving in a tunnel, and a narrow bridge, only rapt attention will prevent crashes. Unfortunately, it is not a game that will hold one's attention very long.

BUDGE'S TRILOGY OF GAMES

Company: California Pacific Computer
Language: Assembly
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**C–**	CONTROLABILITY	**B–**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**D**	HOLDS INTEREST	**C–**
GAME DEPTH	**C**	GRAPHICS	**D+**	VALUE FOR MONEY	**D+**

BUDGE'S TRILOGY encompasses three games, all making extensive use of the Apple's Hi-Res graphics: (a) NIGHT DRIVER—interesting use of Hi-Res graphics. Uses a paddle to stay on a rapidly changing course. Of the seven or so people that we used to test this game, most were able to obtain a maximum score at the highest level of difficulty very rapidly and were not interested in playing the game again. (b) PINBALL—Fast and good Hi-Res graphics result in a better than average pinball game for one or two players. (c) SPACE WAR—two players game using a combination of paddle control and the keyboard (somewhat awkward). Though the Hi-Res routines are good, the game is only average.

INTERNATIONAL GRAND PRIX

Company: Riverbank Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B**	DOCUMENTATION	**C**
CREATIVITY	**C+**	CHALLENGE	**B**	HOLDS INTEREST	**C+**
GAME DEPTH	**C**	GRAPHICS	**C+**	VALUE FOR MONEY	**B**

INTERNATIONAL GRAND PRIX is a very realistic, Hi-Res racing game on a "Grand Prix" type course. The object is to run the selected number of laps in the least time. One is given a choice of automobile with five speed manual transmission and a specific amount of fuel. The race course is displayed from the driver's perspective, with side markers of the roadway trailing off in the distance. As the car negotiates, the markers move towards the screen, providing 3-D effect.

The driver's instrument panel includes a speedometer (with a reading of up to 200 mph), a gear shift indicator, tachometer, an edge detector which shows the relationship of the car's front and rear wheels to each other and to the sides of the road plus lap times. Steering, accelerating and shifting is done entirely by one paddle. Pressing the button accelerates the car. An automatic transmission will shift to the next higher gear at a certain speed but is incapable of decelerating the car rapidly on a turn. With no brakes this is not the recommended technique. The manual transmission has to be hand shifted. When the RPM's are varmaxed, pressing the button rapidly will upshift. At lower RPM's, this technique will automatically downshift.

Warnings for all hazards or turns are given prior to actually seeing the turn. Obviously, you can't do a hairpin turn at 130 mph without spinning the car out or running off the course. Hitting the outside marker costs time in accelerating from a standstill in addition to assessing fuel penalty. Also, running the engine at the red line burns excessive fuel.

With a difficulty level that can be varied from a car that sticks to the road like a vacuum cleaner to *one that drives* on ice, this game can be made as challenging as your driving ability.

RETRO-BALL

Company: Sierra Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $26.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	**C–**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**C**	HOLDS INTEREST	**D**
GAME DEPTH	**C–**	GRAPHICS	**B–**	VALUE FOR MONEY	**C–**

This game brings Air Hockey (or in this case Rocket Air Hockey) to the Apple. The game is designed for two players or just one against the computer. Each player has control of the puck only when it is on his side of the screen. The object is to steer the ball into your opponent's goal and score 10 points to win.

The direction of the puck is controlled by paddles and there are only four directions: up, down, left or right. The paddle button fires the rocket for the duration of the press only while it is in your court. To keep the game moving, there is a penalty for holding the ball more than 5 seconds. Defense is straightforward, as one can deflect the puck by reverse-thrusting when it enters your court. Although the game is simple in theory, it is hard to learn to control the ball and master the game. Early attempts using a strategy involving wild random thrusts to score successfully appear to be only a matter of luck. The game does require skill to play.

The game's graphics are superb and the action is incredibly smooth and fast, thanks to a device known as VIDEOSYNC.™ This technique uses a wire that connects your Video Synchronization signal to the cassette port input. The program then knows when to draw and erase the Hi-Res screen. The result is smooth, unflickering graphics. All video messages are also done in nice marquee style at the top of the screen. In short, the game is nicely done.

FIREBIRD

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

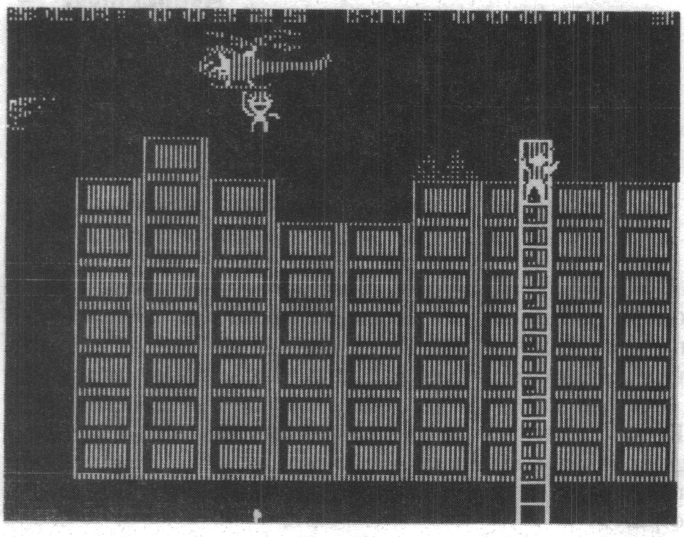
OVERALL RATING	C	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	B–	CHALLENGE	B	HOLDS INTEREST	D+
GAME DEPTH	C–	GRAPHICS	B	VALUE FOR MONEY	C

A firefighting pig scurries up and down a ladder in FIREBIRD while attempting to douse flames set by firebombs dropped by a malicious bird. Yes, its Piggo, the amazing firefighting pig, racing against time to save a burning building and its frightened occupants who would rather leap to their deaths than face the cruel and infernal flames.

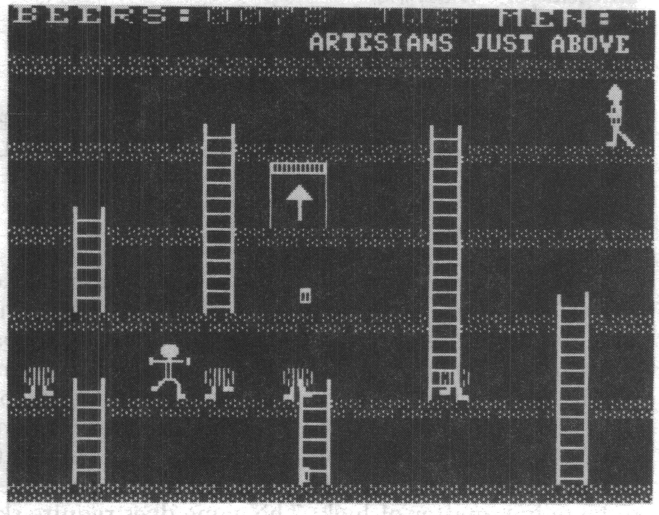
Your job is to control Piggo's firefighting abilities. The game is keyboard-controlled with the A and Z keys used for ascending and descending the ladder, the arrow keys for positioning the ladder, and the space bar for activating the hose. It is a high-paced game with firebombs landing every 8-10 seconds. It takes practice to keep ahead of the bombs. You must race into position just after each bomb sets an apartment on fire. If you douse the flames quickly with a squirt from your hose, you can save a section of the floor; however, if you are slow your efforts are hampered by fleeing victims who fall into your arms. Since you can't douse flames while holding a victim, they must be escorted to an overhead helicopter which will whisk them to safety. On its return, the helicopter will drop a replacement apartment unit.

This is unqualifiedly a game of uncontained frenzy; one which you are inevitably destined to lose quickly. When two sections of the building burn completely to the ground, it collapses and the game ends. Points are awarded for dousing flames and saving victims. More points are awarded for saving victims and escorting them to the roof than for fighting the fire. However, this is just a short-term gain since, if the building goes, so does the game. If you are skillful enough to keep the bottom row of nine apartments intact with no upper units in existence (seemingly impossible), FIREBIRD will award you with 5000 bonus points and a new building.

The game's graphics are very good and whimsical. This reviewer is of the opinion that this game is much more suited to children than adults; however, children might find the game's speed somewhat intimidating, especially beginners. Different speed levels as an option would have been appropriate. There is no doubt that the game is challenging, but it becomes an effort to give it your best shot when your fate is sealed in a losing performance. One's ego gets damaged once to often for this contest to sustain any long-term appeal. Piggo simply has just too much to handle with this one.



FIREBIRD



BEER RUN

CONGO

Company: Sentient Software
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**C–**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**C+**	CHALLENGE	**C**	VALUE FOR MONEY	**D**
GAME DEPTH	**D+**	GRAPHICS	**C**	HOLDS INTEREST?	**C–**

The object of *Congo* is to rescue stranded adventurers as you steer your raft down the swift flowing and dangerous African river. The premise is that your boat has broken up along the river's rapids and that your fellow adventurers have washed downstream, where they cling to islands or the marshy but unfriendly shoreline. You must rescue and escort them to a safe harbor.

You steer your raft by joystick or keyboard controls. The scenery moves one way, while your raft remains relatively stationary to produce a nice scrolling effect. When you want to stop or move up stream, the drift keeps you going downstream but at a much slower rate, while the side to side motion varies with your direction. Obviously you have little effect against the current or when floating with it, but you have good control while paddling with the current. There are many hazards that you must avoid. Rocky islands frequently block your progress, and warlike natives are always traveling along the river. Alligators and cheetahs patrol the shoreline, while spouting hippos and an occasional water snake swim upstream right in your path.

The game has cute animation effects using a funky artistic style. The graphics work to the extent that you appear to float downstream in a raft. However, the game has little depth and doesn't offer much of a challenge. Definitely a kid's game.

BEER RUN

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 9
Disk or Tape: Disk*

OVERALL RATING	**B+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**B–**
CREATIVITY	**B**	CHALLENGE	**B+**	HOLDS INTEREST	**A**
GAME DEPTH	**B–**	GRAPHICS	**B**	VALUE FOR MONEY	**B**

BEER RUN is a strategy-oriented arcade game, wherein the object is to climb to the top of a brewery by outmaneuvering the building's wandering guzzlers and patrolling bouncer, catch a blimp from the roof to the Olympia brewery, then catch one of those elusive Artesians. The game, with its floors connected by a chain of ladders and little guzzler characters in constant pursuit of you, bears a strong graphic resemblance to the game, "Apple Panic". In this game, however, the only defense against the guzzlers is your wits and the ability to reach an elevator adjacent to the next set of floors. However, not all elevators lead upward. The ladders are easy to climb, but can only be descended one level at a time. Although the building is only 30 stories high, the roof isn't easy to reach. The real kicker involves levels 21-25, where a single ladder on one floor often becomes a deadly trap when being pursued by five drunken beer bozos and a mean bouncer. If you get caught, you must start over at the bottom of the building, minus one of your three men.

The game and graphics are nicely implemented. The characters are humorous in appearance — especially your man, who looks like he is either drunk or traversing a narrow ledge. The game is either paddle- or keyboard-controlled. The paddles control the players' horizontal direction, while the paddle button causes him to either climb or descend a ladder.

The mysterious Artesians are always just beyond your grasp. Messages inform you that they are on the levels just above you, but these imaginative creatures may be only just that — creatures preying on your, by this time, frazzled imagination.

BEER RUN is a fun game. Beginners might find the contest initially frustrating, since it is a game that is easy to learn, yet hard to master (in which case, if you are of age, just relax with a couple of beers, then sublimate yourself back into it).

SATURN NAVIGATOR

Company: Sub-Logic
Language: Applesoft & Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	A	SKILL INVOLVED	B	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST?	B
GAME DEPTH	C	GRAPHICS	D	VALUE FOR MONEY	B

Saturn Navigator illustrates how spacecraft are maneuvered from one planet to another. The goal is to leave Earth orbit and link up with a space station in a circular orbit inside Saturn's inner ("A") ring. The trip is made in four stages: trans-orbital flight from Earth orbit to Saturn; Saturn approach and injection; and rendezvous. The mission must be performed within the constraints of the available fuel supply.

The program is quite realistic, and is both a game and an educational tool that does well in both regards, but excels at neither. The user receives a visual and painless introduction to the laws of orbital mechanics, in which the multi-variant mathematics are neatly hidden from view. As an educational tool, more could have been done with little effort; Hohman (minimum energy) transfer orbits, nodal crossings, and orbital periods are inherent in the program and the documentation, but are not noted (although less important aspects are dealt with in moderate detail).

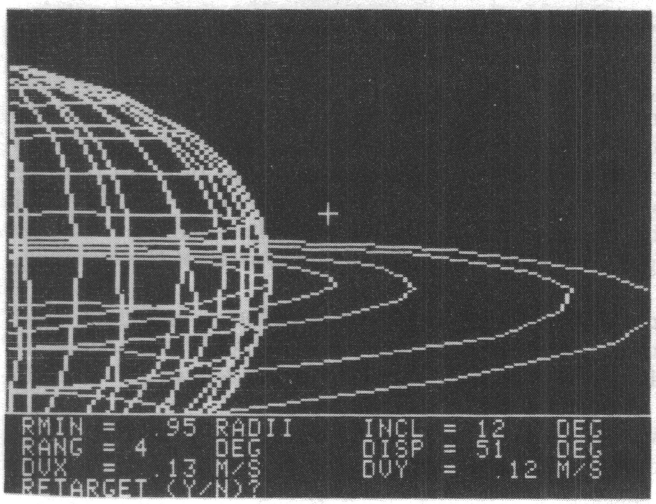
Each stage bears directly on the later phases. Fuel depletion and ring plane collisions necessitate starting over, which may be done at the last orbit update (without using the save game feature), or at the beginning. Ring plane collisions are a common but major disaster, due to poor ring graphics and an inadequate definition of the ring gaps.

After choosing a trans-orbital velocity and leaving Earth, several mid-course corrections are performed. Each provides a view of Saturn and your "aim" point, and allows retargeting of the approach. At Saturnian injection, overhead and plane views show your inclination and projected ring plane penetrations. At any phase, trial adjustments for velocity changes may be evaluated before having to commit to them.

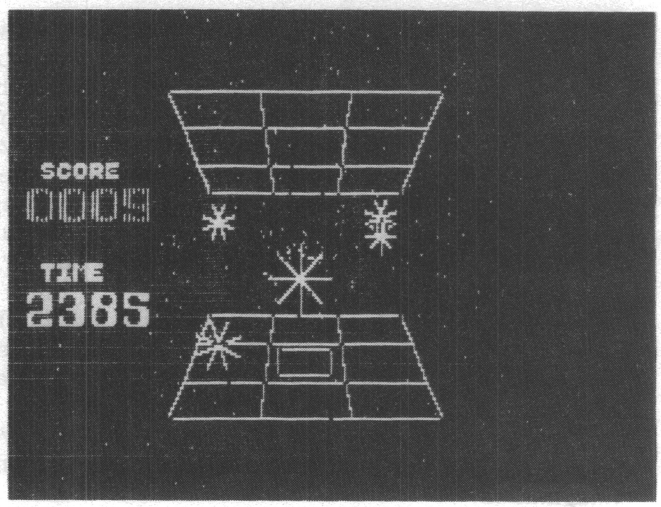
When you accept your approach maneuver, the view screen shifts to a 3-D display. Its like watching a step-frame movie as Saturn and its rings get closer and closer. The B&W meridian-line graphics update in a jerky manner every three seconds. Assuming you successfully attain Saturn orbit, and get the display of the space station, the hard part of the game starts: rendezvous. Unfortunately, neither ranging data nor the success criteria are provided; *if you* think you've linked up but don't get the congratulatory text ending, you aren't close enough.

Despite some minor shortcomings, *Saturn Navigator* offers a notable concept and achievement. While children without adult supervision may find it frustrating at first, they cannot help but learn in the process. Adults will learn even more, and may even get competitive with the game.

NOTE: Earlier versions of this program sold for $24.95, but required ownership of the A2-3D1 graphics package. This newer package incorporates the graphics package into the program.



SATURN NAVIGATOR



STAR DANCE

STAR DANCE

Company: USA Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	D+	CONTROLABILITY	B–	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	D+	HOLDS INTEREST	D+
GAME DEPTH	C–	GRAPHICS	B	VALUE FOR MONEY	C–

Star Dance is based on an unusual arcade game called *Sundance*. The display presents two 3 X 3 grids hanging in space. Stars slowly bounce between them. The object is to score as many points as possible in a limited time by catching these bouncing stars in one of nine open cells or blasting them with your nova. The open cells on the grid are controlled by positioning the joystick. If a star is caught, a point is scored. You can also shoot a star through an open cell. However, if you miss, you must catch another before being able to fire again. There are bonuses for doing exceptionally well, which will extend your time limit.

The game can be played with either keyboard or joystick. Joystick play is obviously the easier and more pleasurable method. The graphics are good, the game concept is sound and it offers a challenge, but the game lacks visual excitement. Most people will find the contest somewhat tedious after a few repeats.

RENDEZVOUS

Company: Edu-Ware Services, Inc.
Language: Applesoft & Assembly
Hardware Requirements: 48K, joystick recommended

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	A–	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	B	SKILL INVOLVED	A	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST?	B
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	A

Rendezvous is a Hi-Res simulation of the docking of a Space Shuttle with an earth-orbiting space station. It is a more graphic and complex treatment of *Saturn Navigator's* somewhat more educational program. Four separate and distinct phases are required to successfully complete the mission: boost phase, orbital rendezvous, approach, and docking. Piloting proficiency and time are further challenges; the less time, the higher your rank (from Swab to Fleet Admiral).

When the stated criteria have been met, each phase links into the next, often with shocking results. The phases become progressively more difficult, as there is less room for error in the latter phases. This is not to say that the first phases are a snap. Proper energy management is a key element. You can achieve at least a partial earth orbit without using any of your third stage energy; but if you use very much, you may not have enough for docking maneuvers.

The trickiest parts of *Rendezvous* are "real world" (or perhaps "real space" would be a better term). The concepts of space flight take some getting used to. For example, to catch-up to a spacecraft, you must be in a lower orbit; to get into a lower orbit you need to slow down. Thus, to go faster, you have to slow down! Also, if adding up-and-down velocities to the front-back and left-right perspective of ground-bound travellers isn't too mind-boggling, try adding the three altitude vectors of roll, pitch, and yaw, and things start to get tough. In space there is nothing to prevent you from charging straight down the road sideways, upside down, or spinning like a top.

Rendezvous does reasonably well in 6-D controllability, and a 3-D representation on a 2-D video screen, although the optical illusions can be troublesome. All six axes may be joystick or keyboard controlled (12 keys, or 1 joystick). The keyboard isn't as sporty, but provides better incremental control. A joystick is easier on the brain and more realistic, but much more disaster prone. Don't despair, for in each of the four phases, ten saved-game positions may be saved to the program disk. On recalling a game, only the positions for the current phase are displayed. Unfortunately, there is no delete capability until you fill all ten positions. To avoid total chaos, keep notes on the status of each game when it is first saved.

The game may be entered at the start of any phase, either from a saved position or from a user-defined set of initial conditions. "Easy" setups are postulated in the documentation for getting the feel of the game. The game will also return you to your initial position in your present phase without having to save it. If you intend to dock successfully, then heed well: keep cool, don't use high rates, and above all, don't make like a jet-jockey and maneuver with rates in more than one axis at a time. (And I don't care if you ARE a whiz at PAC-MAN!)

CYCLOD

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	D	VALUE FOR MONEY	D
GAME DEPTH	D	GRAPHICS	C–	HOLDS INTEREST?	D

Cyclod pits an eyeball against a roomful of snakes. If this sounds interesting, read on. In each level of the game, seven snakes randomly meander about a maze while seeking to destroy a solitary eye. Fortunately they don't all appear at once, and you can use any of the maze's red bricks as weapons to crush the snakes. Some of the maze walls are stationary, while others, consisting of red bricks, can be moved by pushing the eyeball against them with either keyboard or joystick controls. Once you have killed all seven snakes, you advance to the next level of difficulty where more snakes inhabit the maze. Skilled players can even start at a much harder level if they choose. The game ends when all three eyeballs are lost. *Cyclod*, finally, is a rather uninspired, strategy-oriented game.

TRANQUILITY BASE

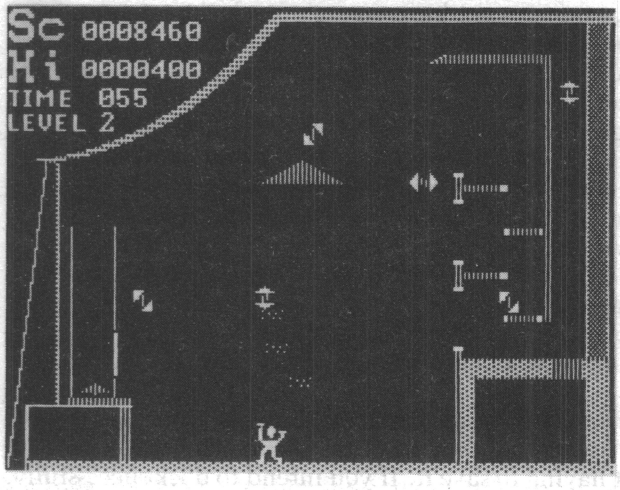
Company: Stoneware
Language: Assembly
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk*

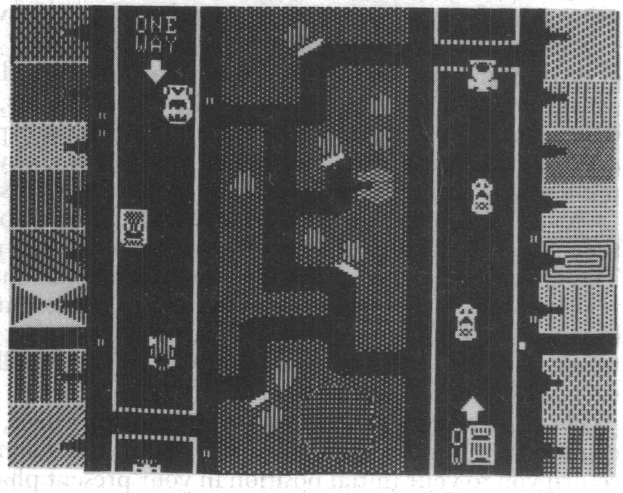
OVERALL RATING	C–	CONTROLABILITY	C–	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	D+	HOLDS INTEREST	C
GAME DEPTH	C–	GRAPHICS	C–	VALUE FOR MONEY	C

Bill Budge's lunar lander game is a Hi-Res arcade quality game in which the user adjusts braking thrust with the paddle and the pitch control using two keyboard keys in order to land on the moon. The terrain, shown in three segments that shift if one's lander flies off the side of the screen, has several flat landing spots scattered between jagged peaks. The view shifts for a close-up of the landing site as the lander approaches the surface.

The object is to land as many times as possible with the given fuel supply. The game incorporates some fine graphics.



JUGGLER



RUSSKI DUCK

JUGGLER

Company: Innovative Design Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C+	CHALLENGE	B	VALUE FOR MONEY	C
GAME DEPTH	C	GRAPHICS	B	HOLDS INTEREST?	C

Being a circus juggler has always required a good sense of coordination and timing. Good hand and eye coordination is required to master this computer version called *Juggler*. Keeping six balls or other objects aloft is the object of this paddle controlled game. One can either juggle objects by using hands or by bouncing them off of discs tossed into the air. Don't worry, you don't have to catch the discs for they just vanish after traveling a set distance towards the top of the screen. More points are given for bare handed juggling than for juggling with the help of these discs. As an added challenge, there are several bonus compartments on the sides that you can attempt to nudge the tossed objects into. They also help in limiting the number of objects that you are actually juggling at any given moment. Miss one object, scratch one juggler. You have three. After a certain time limit the game progresses to a harder level where the size of the tossed discs becomes smaller.

Juggler certainly keeps you on your toes while you juggle six objects simultaneously. The animation is smooth yet simple, and the action is very controllable. The game is cute and an interesting diversion for those who enjoy a game that requires lots of practice to achieve a high score.

RUSSKI DUCK

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C–	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	C	VALUE FOR MONEY	C
GAME DEPTH	C+	GRAPHICS	C	HOLDS INTEREST?	C+

Russki Duck could be considered a real time adventure game, for it combines the problem solving characteristics of an adventure with the animation of an arcade game. You're a CIA agent. Your country's MX missile plans have been stolen and hidden in a Russki Duck that is packed in a shipping crate awaiting transport to Moscow. Your mission is to find those plans and return them to the CIA vault.

You play on a main map consisting of two parallel streets separated by a park and highway. Various shops, government buildings, and embassies line the two streets. Your player, represented by a red dot, is maneuvered across traffic and into buildings by keyboard control. Upon entering any building (some have several rooms), the view shifts to a room containing various objects and wandering KGB agents who are intent upon killing you. These agents meanwhile steal objects and deposit them in other buildings.

Players accumulate points by recovering the MX plans, and by playing good samaritan, recovering stolen goods and returning them to their rightful owners. The mission has its perils. Besides death by assassination, you can be killed by speeding cars, or blown to bits by bombs hidden in packing crates. You have several lives, but must start over again in the CIA building. Your only weapon against enemy agents is a hammer, but you can fool them by wearing a mask.

The strategy is to work rapidly, in finding and using the necessary objects to solve the next piece of the puzzle before the KGB agents move them. You may be opening crates with a hammer when you suddenly find a bomb. Because you can only carry one object at a time, you have to rush out to find a screwdriver to disarm it, but by the time you return, the bomb has exploded and the unopened crates and your hammer are scattered in other buildings on the streets. Start searching.

The game is not very difficult, and is more suited for children. The graphics are simple but cute and appealing to the young mind and spirit. Although the *Russki Duck* has a random start, the game takes on a repetitious flavor after playing it several times.

ROCKET COMMAND

Company: Norell
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B**	DOCUMENTATION	**C**
CREATIVITY	**C+**	CHALLENGE	**B**	HOLDS INTEREST	**B**
GAME DEPTH	**C+**	GRAPHICS	**C+**	VALUE FOR MONEY	**B**

ROCKET COMMAND is the Apple version of the arcade game Missile Command, where you defend six cities from an enemy rocket attack with three anti-ballistic rocket bases. The control system is a joystick-controlled cursor which directs the destination for any rocket fired from one of the three bases. Selection of which base is done by the #1, #2 or #3 keys. Each has ten anti-ballistic rockets like the arcade game; after firing the first rocket, one can quickly reposition the cursor to fire repeatedly.

The first attack is easy but soon the onslaught accelerates and missiles begin to split or MIRV. A satellite target and an enemy airplane that drops several nuclear warheads are included. As you advance into higher levels, intelligent missiles try to outsmart your defense system by hovering over your exploding anti-missiles. There is a pause between each attack wave or level to display the score and bonuses.

The graphics are quite good in this version of the game. Although it lacks much of the color of the arcade game, it is the closest and best implemented of the five versions that have reached the Apple market.

MISSILE DEFENSE

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C**	CONTROLABILITY	**B–**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C**	DOCUMENTATION	**C–**
CREATIVITY	**C+**	CHALLENGE	**C+**	HOLDS INTEREST	**C+**
GAME DEPTH	**C**	GRAPHICS	**C**	VALUE FOR MONEY	**C–**

MISSILES DEFENSE is a Hi-Res arcade game in which where you defend your cities from nuclear attack with three antiballistic bases. This version is more faithful to the original arcade game than Muse's ABM. Armed with 10 missiles per base, one quickly aligns a sight with either a joystick or keyboard controls, then fires from one of the bases. Like the arcade version, after firing the first missile, one can quickly set a target for the next missile without waiting for the first to hit.

The first attack is easy to defend but soon either your missles run out or your bases are destroyed. The game pauses at the end of the attack to give you a breather while displaying your score and the number of cities left. Armed with new antiballistic missiles, you must defend your remaining cities against a second wave that include smart missiles and multi-independent reentry vehicles that split and fan out toward your cities.

The keyboard option is for people lacking a joystick. This option, using nine direction keys, takes a little practice. Hitting the same key twice or three times moves the target faster, but this is barely adequate on the slow attack. One definitely needs a joystick for the fast mode, but there is a disadvantage involved in holding the joystick with one hand while choosing the missile base to fire with the 1, 2, and 3 keys on the keyboard.

While many arcade purists will prefer this game over ABM, the missiles are too predictable. The game also doesn't give you a chance to knock out a missile before it splits because the split appears from nowhere rather than splitting from an incoming rocket.

The graphics and sound are well-implemented. The only thing lacking is the little ship that appears in the arcade version.

PLANET PROTECTOR

Company: Magnasoft
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C–
CREATIVITY	C+	CHALLENGE	C+	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	D

PLANET PROTECTOR is another version of the Missile Command game. The graphics in this game have a very modernistic flair. The cities, explosions and even the sound routines take on a futuristic flavor. The game is fairly similar to the arcade version and requires a joystick. It does lack some of the advanced features, such as smart bombs, satellites and enemy aircraft. The game seems a little slow and is the most expensive of the group.

ABM

Company: Muse
Language: Applesoft
Hardware Requirements: 48K

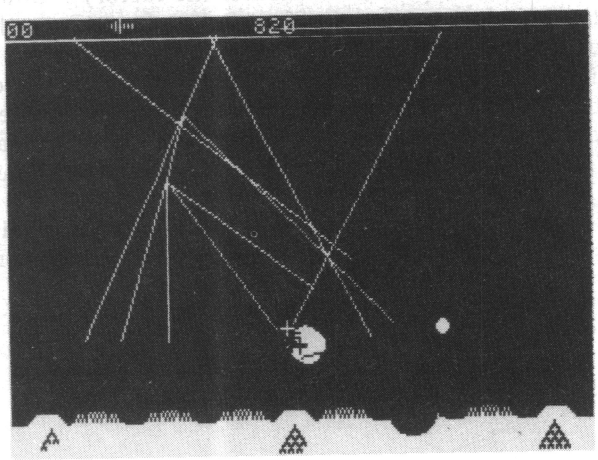
Department: Entertainment
Sugg. Retail: $25.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	B–	HOLDS INTEREST	B–
GAME DEPTH	C+	GRAPHICS	C+	VALUE FOR MONEY	B

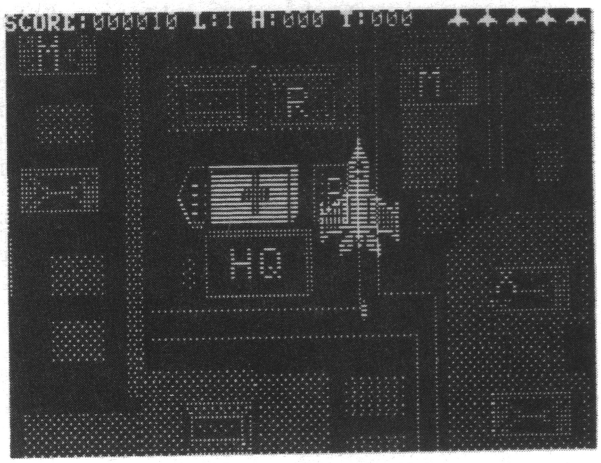
ABM, which stands for Anti Ballistic Missile, is the Apple version of the Missile Command arcade game. Your job is to defend six East Coast cities against massive nuclear attack, presumably by the Soviets. Your defense consists of five missile bases, some armed with two-kiloton warheads; others, five-kiloton warheads. As the incoming missiles begin their descent, one positions a target crosshair (a joystick is almost a necessity) and fires either of the two types of anti-ballistic missiles. The computer, depending on the crosshair's position and range, decides which missile actually fires.

The strategy is to destroy kill the incoming warheads as early as possible, since they accelerate as they get closer to earth. There is also the possibility that some of the missiles are MIRV's (or multi warheads) that split as they descend into six or more separate warheads, each armed for different cities. The game becomes harder as you score more kills. The onslaught of incoming missiles becomes intense and soon some missiles change course in midstream, while others carrying MIRV's split, sometimes splitting again. Soon, as city after city is destroyed in massive fireballs, you're left defending one lone city and maybe one or more missile bases. By then you notice that all the missiles are heading towards your last city.

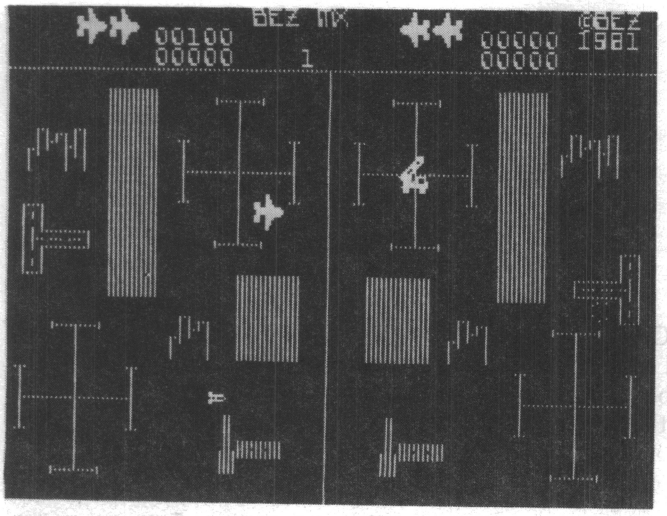
This game makes nuclear war almost fun. For those who are always trying to impress their friends with their latest high score, which may cause doubt, this game writes the high score on the disk. The program also incorporates a paddle-adjust routine, otherwise it could prove difficult to reach all points of the screen with your cross-hair if your paddles or joystick don't have a full range.



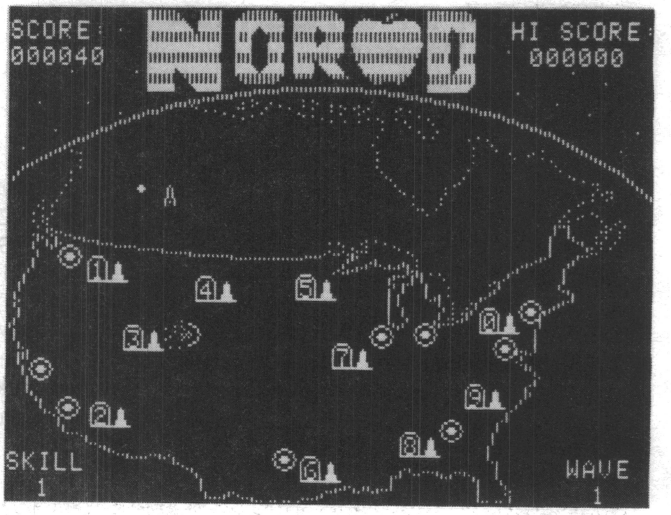
ROCKET COMMAND



PHANTOMS FIVE



BEZ-MX



NORAD

BEZ-MX

Company: Bez
Language: Applesoft Compiled
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B+	ERROR HANDLING	A–
GAME CONCEPT	B–	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C+	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B–	VALUE FOR MONEY	B–

BEZ-MX is an interesting strategy-oriented war game for either one player against the computer or two players acting as opponents. The game offers both strategic planning and some real-time control of the actual battle phase. It consists of an aerial battle between two adjacent countries using MX missiles and BEZ bomber weapon systems.

Each player independently inputs battle orders for his weapons at the start of each round. The opponent is asked to leave the room. Missiles can be targeted to hit either the enemy's cities, airfield, factory, or missile sites. Bombers can be used for either strategic bombing or defense of a particular area. They can knock out incoming missiles. Trucks can be assigned to transport missiles between silos. In both the advanced and basic games, paddles control missile launch timing and the position of defensive bomber. In the solitaire version, control of all weapons is predetermined by one's orders.

Missile bases are resupplied after each round. The replenishment level depends on whether the factory is intact and in production. In the advanced game, players can assign the populace to work in factories, on farms or at the military bases. Thus, production of strategic materials and weapons can be varied to suit the flow of battle.

BEZ-MX is much more of a beginner's war game than one might expect. It's simplicity makes it fun for the novice while its animated battle sequences will hold even a child's attention. An entire war scenario will require only less than half an hour. Entering orders is easy; the program also performs extensive error checking. The ability to read target coordinates from a supplied map is all that is required. The enemy's country is hidden during the orders phase of the game.

The game uses adequate B&W character generator graphics in very orderly displays. The documentation is fair, offering several hints on advanced strategy. However, it omits much on purpose, so that the player can experiment with tactical procedures and maneuvers.

NORAD

Company: Western Micro D
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	B	CONTROLABILITY	B–	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	C+	GRAPHICS	B	VALUE FOR MONEY	B

Norad pits an enemy barrage of intercontinental ballistic missiles against your anti-ballistic defense system. The enemy missiles, surging in waves over the polar route, are aimed directly at the largest cities of the United States. The object is to intercept them with anti-ballistic missiles launched from one of 10 scattered bases.

The game is a totally new approach to the usual missile command genre. It features a map of the United States as seen in perspective from above the equator. One has a clear view of incoming missiles over the Arctic from this angle. The missiles are guided by the arrow keys, and detonated by the space bar. However, only one missile can be controlled at a time, although one can launch missiles simultaneously. Destruction of useless ABM's becomes a key part of the strategy.

Once a missile wave has ended, damaged cities are rebuilt and missile bases are resupplied. It does take a certain number of surviving cities to maintain an adequate defense posture. If you survive enough attack waves, Congress will appropriate a mobile MX base that can't be hit. A nuclear firing submarine comes much later.

Norad offers a much more strategic game than the usual missile defense games that you have seen or played in the arcades. The game incorporates three levels of play and offers a challenging and fun experience.

PHANTOMS FIVE

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C
GAME DEPTH	C+	GRAPHICS	B	VALUE FOR MONEY	C+

PHANTOMS FIVE is a Hi-Res arcade game wherein the object is to bomb targets with your Phantom fighter while flying over the enemy's territory. The area is defended by batteries of anti-aircraft guns and squadrons of fighter planes that periodically engage your planes in combat.

The view is from above the bomber with the ground scrolling beneath it. The pilot can steer the plane by paddle control as he maneuvers to avoid the enemy flak and adjust his bombsite over various targets. Various lettered targets are worth anywhere from 20 to 100 points, but bombing a POW camp costs you half your points, while a hit on a red cross hospital costs all your points. The paddle button releases each bomb.

When the enemy sends up fighters, the view shifts to a forward view of the planes engaging your bomber in combat. Machine guns can be aimed and fired with the paddle controls as fighters bob and weave and shoot back. The longer you hold out the faster they come. A hit from one of these realistic-looking three-dimensional planes means a bullseye through your windshield and a lost plane. You have five planes to complete your mission. The level of difficulty increases (more flak, faster fighters) for every successful pass over the target area. The player's fighter drops to a lower level when a bomber is shot down.

This game has excellent graphics. Nasir, who has previously written Cyber Strike and Both Barrels, has produced a very playable game. The game seems to alternate nicely between bombing and fighter modes to break what might be a repetitious game.

TUNNEL TERROR

Company: Adventure International
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C–	CHALLENGE	C	VALUE FOR MONEY	C
GAME DEPTH	B–	GRAPHICS	C+	HOLDS INTEREST?	C

Tunnel Terror is a very abstract game based on the arcade game *Tempest*. It is a game of quick reflexes, where the object is to destroy shapes and ships that move towards you in a circular ring of channels or tunnels. As you move your spaceship about the perimeter of these tunnels by paddle or keyboard control, you unleash a barrage of fire until all the enemies have been destroyed.

Each successful encounter advances you to the next level of difficulty. The number of tunnels, starting with three, increases by one for each level. Whether this is true for each of the 61 levels is unknown since this reviewer hasn't advanced beyond level 9. The enemies must be destroyed before they reach the top of the tunnel. Although some of the enemy shapes will retreat, the walker-carrier will split into two walkers, which proceed around the circle in an attempt to destroy your ship. You can usually kill them by holding down the fire button while moving in a sweeping pattern, but only if you have allowed your shots to regenerate. The game only allows eight shots down the tunnels at any one time. On higher levels "crazys" appear. If they reach the top and pursue you, you must avoid them, hoping they will retreat before you are trapped. There is no Super Zapper in this version.

Tunnel Terror as a game is novel and challenging, but as an imitation of an actual arcade game, it is hampered by the Apple's technology. The hyper warping through one tunnel to the next set of tunnels, which carries the original game's theme, is missing. Thus the use of spikes in this game becomes totally meaningless. The game's paddle control system allows one to circle the tunnel twice, and gives a warning marker when you approach either end of your paddle range — a good compromise to the absence of continuously turning paddles on the Apple. Overall the game has merits, and should appeal to players who like games that require quick reflexes rather than strategy.

LAFPAK

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	C+	CONTROLABILITY	B+	ERROR HANDLING	N/A
GAME CONCEPT	B–	SKILL INVOLVED	C+	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B	VALUE FOR MONEY	C+
GAME DEPTH	B	GRAPHICS	B–	HOLDS INTEREST?	C+

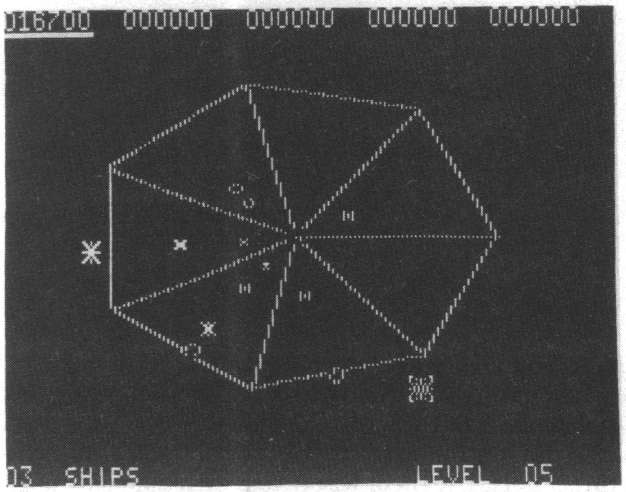
Lafpak contains four arcade games of widely varying quality. As a concept of game packaging it is ideal, for it offers a group of games at a fair price. Considering that one of these games is offered by two other software vendors in the $30 range, the public is getting a good value.

Probably the best game on the disk is *Creepy Corridors*. You guide your man in search of treasure through a maze infested with spiders. You can kill any of these spiders by shooting in the direction that you are traveling. Once all four treasures are retrieved, an exit is revealed that leads to the next level. The upper levels have many more spiders and the more advanced levels have skulls that can't be killed. This one is fun to play and quite challenging.

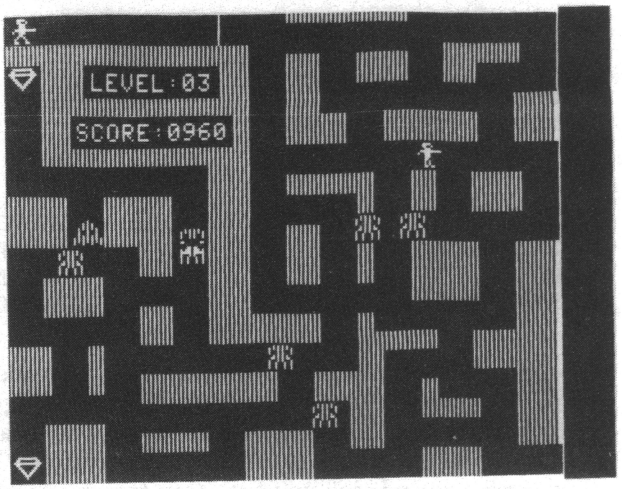
Mine Sweep is a novel game involving an attempt to clear a minefield within a time limit. You steer a man who explodes the bombs by firing at them. Detonating the larger bombs sometimes causes a small chain reaction, so that you must stay some distance away. The game wouldn't be that difficult except some creature occasionally crosses the screen and lays more bombs. Frankly, I don't think it is possible to win.

Space Zap is a simple game of reflexes. Your ship is being attacked from enemies on four sides. Using keyboard control, you must ward off the attack by aiming and firing your four guns. This is a game that is commercially offered by other software vendors under the names *Outpost* and *Escape from Arcturus*.

Space Race is a rather boring game where two people race to the top of the screen while avoiding the flying bats. You get points for a completed mission but a penalty for losing a ship. Obviously, you have to take chances to win. Give this game five minutes of your time, for it isn't very good.



TUNNEL TERROR



LAF PAK

BEZ OFF

Company: Bez Software
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $32.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**D**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**D+**	DOCUMENTATION	**C**
CREATIVITY	**D**	CHALLENGE	**C–**	HOLDS INTEREST?	**D**
GAME DEPTH	**C–**	GRAPHICS	**C–**	VALUE FOR MONEY	**D–**

Bez Off is a trilogy of "kill the insect" games. The score is cumulative among the games, and you play each only once. On the whole they follow a single theme, and are interconnected much in the way that the arcade game *Tron* has you exterminate the insects from various rooms of a house. However, each of these three games presents you with a no-win situation: the levels increase in difficulty within each game until you lose.

Here are some examples. In one game you must stomp on ants before they eat the sugar cube. Another gives you a joystick controlled can of bug spray with which to kill flying moths. The third arms you with a floating pair of scissors to kill spiders that are descending to the ground from their webs. The first two are unimaginative clones of public domain software, while the third game is original.

All of the games are rather spartan graphics wise. Although they become more difficult as you play, they are, on the whole, repetitious and unexciting.

ALIEN LANDER

Company: Sierra Software
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**D**	CONTROLABILITY	**C**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C–**	SKILL INVOLVED	**D**	DOCUMENTATION	**C**
CREATIVITY	**D**	CHALLENGE	**C**	HOLDS INTEREST	**D**
GAME DEPTH	**D+**	GRAPHICS	**B**	VALUE FOR MONEY	**D**

In ALIEN LANDER, the player navigates his spaceship for a soft landing on an alien planet. Landing is accomplished by adusting his thrust to slow the ship. The view is through the window of the spacecraft and overlooks a very clever, 3-D view of the alien landscape. One must save enough fuel to take off again. The Hi-Res graphics are very nicely done.

The lack of maneuverability other than straight-up and straight-down tends to make this a somewhat tedious game after several tries. It is certainly better done than its predecessors, however. Definitely intended for plebes in Space Academy; advanced Tom Corbetts can finesse this challenge.

LABYRINTH

Company: Broderbund Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**B–**	CONTROLABILITY	**C+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**B**	DOCUMENTATION	**B**
CREATIVITY	**C+**	CHALLENGE	**B+**	VALUE FOR MONEY	**B–**
GAME DEPTH	**B–**	GRAPHICS	**C+**	HOLDS INTEREST?	**B–**

Labyrinth is a difficult maze game in which the object is to rescue four imprisoned humans locked in boxes on each maze level. You, a blue, diamond-shaped figure, can move around the screen by either keyboard or joystick control. You are armed with a "trapper zapper" that can shoot in any of four directions. You'll need this weapon frequently to kill the creatures that emerge from the horrors beneath the central box. These creatures patrol the dot-filled corridors and seek you out. Your trapper zapper only has three shots. Use them wisely to punch a hole through a wall or to kill a creature. If you can outgun a monster, you receive an extra shot. But beware, these monsters are quick on the draw, and they have an uncanny sense of when an intervening wall is about to open. Yes, these walls move, sometimes helping or sometimes hindering your quest. And if you manage to survive and free all four prisoners, the entrance to the next level is revealed.

The publisher claims that the keyboard mode is more responsive than the joystick mode. It is probably true because you have to turn in the direction that you want to fire, and this slight delay can cost you one of three lives. However, using four keys I, J, K, and M that aren't quite a diamond for steering and another four in a similiar arrangement for shooting requires good manual dexterity and hours of practice.

The game's concept and graphics are fair. It's another eat the dots game but with enough differences to make it a worthwhile edition to your game library. If you enjoy maze games, then you will probably like this version.

MICROWAVE

Company: Cavalier Computer
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

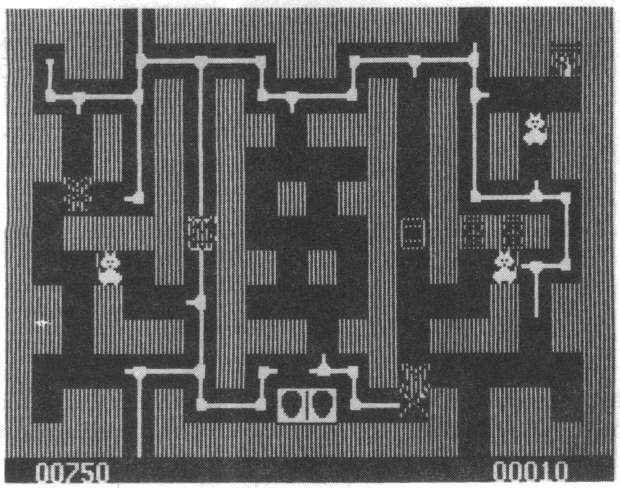
OVERALL RATING	**B+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**B**	DOCUMENTATION	**C+**
CREATIVITY	**A–**	CHALLENGE	**B+**	VALUE FOR MONEY	**B**
GAME DEPTH	**B+**	GRAPHICS	**B+**	HOLDS INTEREST?	**B+**

Microwave is a multi-level maze game where the object is to guide a lovable teddy bear through the corridors of a bomb-strewn maze while being chased by four bad guys. The goal (besides remaining alive), is to collect the scattered tools on the floor of each level. When the bear has collected every tool, an exit appears that leads to the next level.

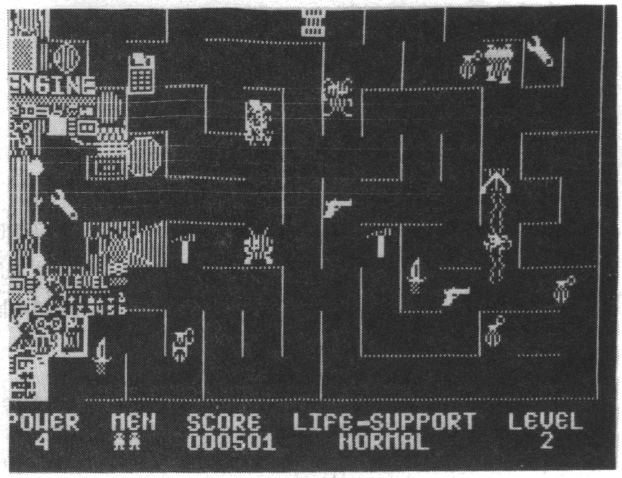
Since four bad guys against one good bear certainly isn't fair, the bear carries a microwave dish that he can drop behind him as he runs. This cooks the pursuer alive. It also opens up a quick escape path since the others aren't suicidal enough to enter the beam. The bear isn't harmed if he doesn't linger too long along the length of the microwave's path.

The game is controlled by either keyboard or joystick. Control is very responsive in either mode, and works best on a spring centered joystick. Dropping the microwave takes practice, for you must remember that the dish is dropped behind the bear while he is running forward. It is slightly different than the usual method of shooting the guy that is in front of you. Suprisingly, it works well in a chase game.

The music and sound effects in this game elevate it beyond most of the other maze games. The music is nearly continuous throughout, and quite a feat for an arcade game on the Apple. The three tunes include chase music from the old silent films, the cantina music from "Star Wars," and a cartoonish, Japanese song called "I Stepped on my Cat." This whimsical touch combined with the game's playful characters lends a light-heartedness to *Microwave*. It certainly makes the game fun. Note that the earliest copies of the game have four mazes over seven levels, while later versions have five mazes over nine levels.



MOUSEKATTACK



MICROWAVE

MOUSEKATTACK

Company: On Line Systems
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C –**	CONTROLABILITY	**C +**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C**	SKILL INVOLVED	**C –**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**C**	VALUE OF MONEY	**C –**
GAME DEPTH	**C**	GRAPHICS	**C +**	HOLDS INTEREST?	**D +**

Dreaming up variations of the ever popular maze games has become a profitable endeavor for software authors. *Mousekattack* reverses the strategy of endless consumption. You play Larry Bain, ace plumber. Your job is to lay pipe in a rat infested maze where rats are bigger than your trusty cat. Cats will scare off the mice — well, most of them, except Super Rat. He has a big red S on his chest. He eats cats WHOLE. Then there are your two traps which can temporarily hold a rat until it gnaws its way through the mesh. If you're quick, you can beat it over the head with your pipe wrench. Of course, if a mouse gets you, you're a dead plumber. Fortunately, you have three plumbers on your staff.

The game can be played by either one or two players. The single player game can be played by either keyboard or Apple joystick. Control keys can be user-defined. However, the two player game requires a Joyport for joystick control. Keyboard control is standard for two players. The game's controls are rather simple. The button allows you to pick up your cat and set it down wherever you like. The cat can be placed in a strategic position that will allow you refuge from those killer rats. Laying pipe is generally easy, except when you're rushed and you make mistakes. You often need to double back to repair bad plumbing joints that leak.

The game is not as simple as it sounds. Many will find that two players are a better match against rats of this size and ferocity, especially if you plan to complete the task and advance to the next level. In summary, *Mousekattack* is just an average maze game with a slightly different twist. In some ways it is harder than most games of its type, and it is the only maze game to date on the Apple that allows a friend to play simultaneously.

TAXMAN

Company: H.A.L. Labs
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 1
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	B+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	C+	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	B+	VALUE FOR MONEY	B+

Taxman is a very realistic simulation of the *Pac-man* arcade game. The object is to steer your man through the hallways of a ghost-infested maze. You score points by eating the dots on the floor, but lose one of your men if a ghost catches you. However, if you reach one of four energizer dots, you become the pursuer for five seconds. When you clear all of the dots, you advance a level.

This version strongly resembles the original in that it uses only part of the screen and places the maze in the vertical (upright) position. The ghost patterns, displayed during their pursuit of your man, are nearly identical to the arcade version. There is even a cartoon presented after two levels. The only drawback to the game is a lack of joystick control. This version is keyboard-control only. Although the choice of keys, both arrow keys, and the + and ? keys are rather close together (some might prefer the up-down keys to be elsewhere), the response is very good. There is also an option for playing with up to four participants. It doesn't take too much practice to become very adept at this version. The only thing this edition lacks is the *Pac-man* theme music.

SERPENTINE

Company: Broderbund Software Inc.
Language: Assembly Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 8
Disk or Tape: Disk*

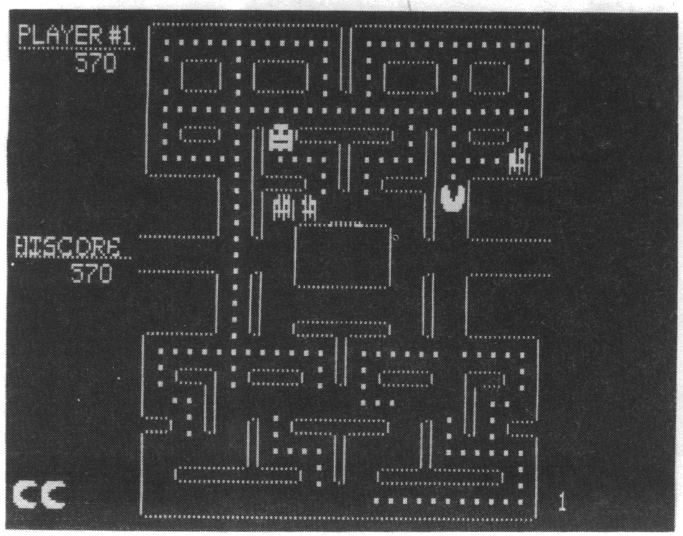
OVERALL RATING	B+	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	B–	CHALLENGE	B	HOLDS INTEREST?	B+
GAME DEPTH	B	GRAPHICS	B	VALUE FOR MONEY	B

Serpentine is an arcade game involving two rival teams of snakes that pursue each other in a closed maze. The object is to chase each other's tails, biting pieces off, until the enemy is smaller and can be attacked head on. You control one snake at a time against three computer-controlled snakes that initially are larger than yours.

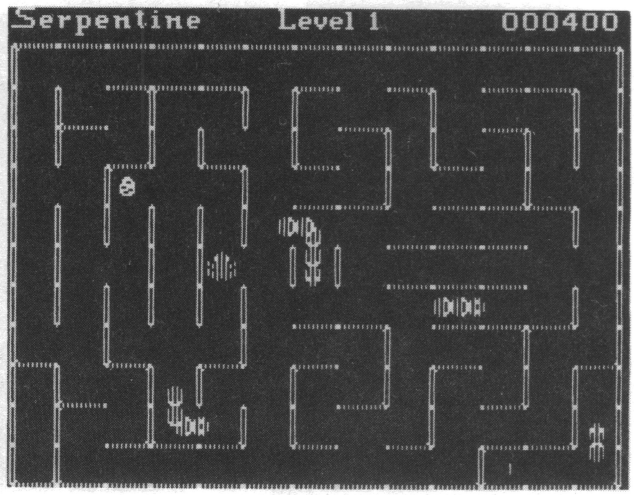
The first priority in a game like this is to eat the frogs that hippity hop around the maze. Every time you catch a frog, your blue snake grows larger by one length. Your snake begins three lengths long, while the enemy snakes are seven lengths long. When, and if, they become smaller by persistent tail attacks, they turn green and then can be attacked from the front. Tail sections aren't nutritious, and don't help you grow in length; however, attacking the snake head on will increase your length by one. Snakes can never grow beyond seven lengths.

Once you have disposed of the three enemy snakes, more of the speckled eggs can hatch, and you advance to the next level. If any of your white eggs remain at the end of the level, they hatch and increase your reserve of warrior snakes.

The game can be played either on the keyboard or with a joystick. The springloaded joystick mode is exceptionally responsive. The graphics are very good, and the game is well-conceived and fun to play. It has that arcade quality of almost being an addictive game.



TAXMAN



SERPENTINE

HUNGRY BOY

Company: Astar International
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**C+**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**C**
CREATIVITY	**B**	CHALLENGE	**B+**	HOLDS INTEREST	**B**
GAME DEPTH	**C**	GRAPHICS	**C+**	VALUE FOR MONEY	**C+**

"Pac-man" arcade aficionados will love this version. It is an exact replica except that the screen is sideways and it lacks some of the bonuses of the "Pac-man" version. The maze and ghosts are identical and just as tough. Control is precise and responsive with either keyboard or joystick. HUNGRY BOY even points in the direction of your joystick command as he eats the dots, which is helpful when approaching intersections. A fine game.

JAWBREAKER

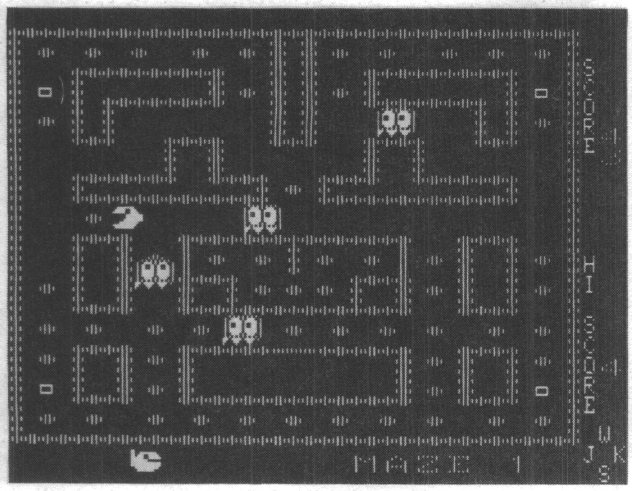
Company: On Line
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 8
Disk or Tape: Disk*

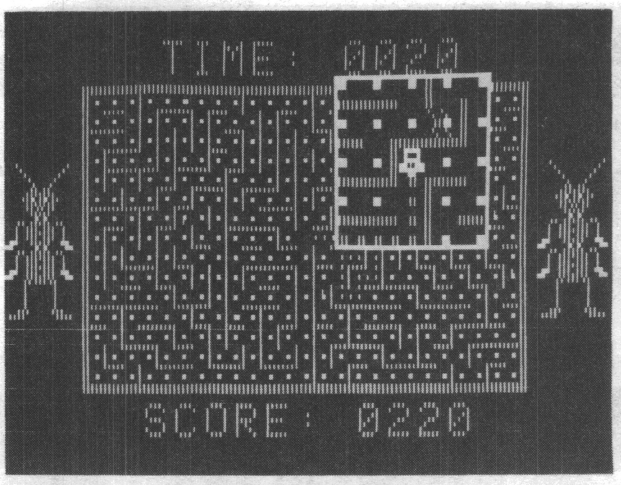
OVERALL RATING	**C**	CONTROLABILITY	**C**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**C**
CREATIVITY	**B**	CHALLENGE	**C**	HOLDS INTEREST?	**C–**
GAME DEPTH	**C**	GRAPHICS	**C–**	VALUE FOR MONEY	**C**

Jawbreaker is another version of the eat the dots game that follows the *Pac-man* theme. The object is to guide a set of teeth through the maze of corridors in a candy factory. You score points by eating the candy on the floor, but lose one of your three jawbreakers if one of the four candy ghosts catches you. However, if you reach one of the energizer dots near the four corners, your jawbreaker becomes invulnerable for several seconds, and you can score a bonus by killing them off, if only temporarily. When you clear all of the dots, you advance to the next level.

The game is controlled by either keyboard or joystick. The joystick mode is not very responsive. The maze is quite different from that of the real *Pac-man* game. Although it is a good strategy maze game, it is not as difficult nor as fun to play as many of the other *Pac-man* clones on the market.



SNACK ATTACK



TUMBLE BUGS

TUMBLEBUGS (DUNG BEETLE)

Company: Datasoft
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	**C**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C**	CHALLENGE	**C**	VALUE FOR MONEY	**C**
GAME DEPTH	**C**	GRAPHICS	**B–**	HOLDS INTEREST?	**C**

Tumblebugs, or *Dung Bettle* as it was originally called, is another maze game involving eating the dot-like tanna leaves. But this game is a little different with a rather unique graphics twist: the maze is about four times as detailed as the usual maze, and thus uses a magnifying glass in the section where your player is in order to enhance the small, detailed pathways. As your tumblebug consumes dots, it leaves a dung trail. The pursuing bugs (creepy-crawlers), which normally wander aimlessly, latch on to your scent upon encountering your trail. They immediately follow the trail, consuming it as they track you. The object is to eat all the dots, while avoiding getting killed. You only have one life.

The game can be played with either a joystick or a keyboard. While the controls are very responsive, the magnifying glass which is intended to help you also blocks the view of your pursuers who are often just beyond the edge of the lens. Thus there is a blind spot between the edge of the lens and the main map. When the enemy finally does get you, it audibly says, "I gotchou." *Tumblebugs* has its merits, but isn't a very exciting maze game.

SNACK ATTACK

Company: Datamost
Language: Machine & Applesoft in ROM
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B+**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B**	SKILL INVOLVED	**C+**	DOCUMENTATION	**B–**
CREATIVITY	**B**	CHALLENGE	**C+**	HOLDS INTEREST	**B+**
GAME DEPTH	**B**	GRAPHICS	**B+**	VALUE FOR MONEY	**A**

SNACK ATTACK is a variation of the Pac man arcade game. The object is to steer a winsome whale complete with rotating tail through corridors of a ghost-infested maze. One scores points by eating the dots on the maze floor (yum yum!). There are doors located in the maze that you can go through which the ghosts can't and doors that they can go through that you can't (turn-about's fair play). The game starts at a slow pace, but picks up as you clear each level. Also included in this amazing melange are three more different mazes, one for each of the first three levels.

The game is quite responsive using the keyboard's four direction keys. The contest is supposed to include a joystick option, but it wasn't available in the preliminary version that we tested. The graphics were good and in color. The game seemed more challenging than "Gobbler", but less so than "Snoggle".

APPLE PANIC

Company: Broderbund
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: Disk*
Disk or Tape: Disk*

OVERALL RATING	B+	EASE OF USE	B−	ERROR HANDLING	N/A
GAME CONCEPT	B+	SKILL INVOLVED	C+	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	B+	HOLDS INTEREST	A
GAME DEPTH	B	GRAPHICS	B+	VALUE FOR MONEY	B

APPLE PANIC is an intriguing arcade game that is virtually identical to Space Panic. You are in a six story brick-floored building. The floors are interconnected by a maze of ladders. The object is to destroy the little apples that are chasing you by digging holes in the brick floors for them to fall into. Once an apple gets stuck in the hole, you have to knock it through the hole by beating it over the head. If you get to the apple too late, it may crawl out of the hole and get you.

Movement control is by the I,J,K,M keys. Keyboard control is very responsive. The A and S keys dig and fill the holes, respectively. The game strategy is very simple. Lure an apple into a hole by letting it chase you, fall through the hole to the next level without injury, then climb back up out of the hole in order to hit it over the head. Kill off all the apples and you advance to a harder level. A Green Butterfly, which proves difficult to kill, can appear on some of these harder levels. In one of these levels, you confront the Mask of Death; a real bummer. You have three lives, but you can earn a bonus life. The game and graphics are exceptionally well done.

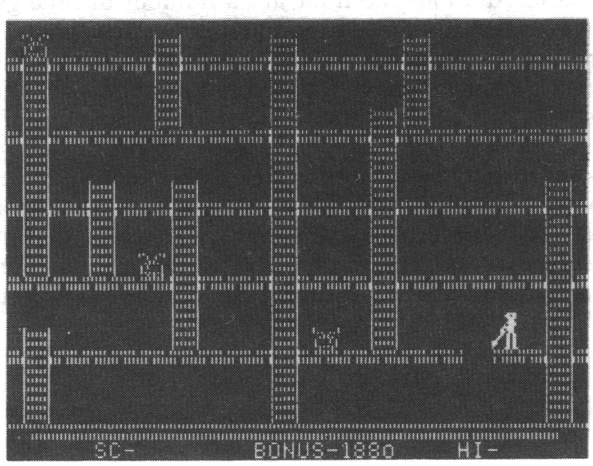
FENDER BENDER [Head On]

Company: California Pacific Computer
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	C
CREATIVITY	C+	CHALLENGE	B	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

This is a rendition of the popular arcade game where a would-be Smokey the Bandit scores points by navigating his car down lanes of a square track. The computer's car races against you in a deliberate attempt to crash into your car. Fun stuff. The player can change either one or two lanes at a time in the four gaps in the course by keyboard control. There is no speed control as in others of this type. (See review of Smash Up.) The game is a definite challenge but somewhat difficult to use with keyboard controls. As an added challenge one can disconnect their paddles for the game to run twice as fast (in which case, a hearty "Go for it, Suicide Seekers!" seems an appropriate epitaph).



APPLE PANIC

HUMAN FLY

Company: CPU Software
Language: Compiled Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	D–	CONTROLABILITY	D+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C–
CREATIVITY	C+	CHALLENGE	C	VALUE FOR MONEY	D–
GAME DEPTH	D	GRAPHICS	D–	HOLDS INTEREST?	F

Human Fly is modeled after the arcade game *Crazy Climber*. The object is to climb up a tall skyscraper, avoid various hazards, and reach the building's top. While the original arcade version is a masterpiece in animation and scrolling, this version flops in both regards. First of all, the animation uses conventional Apple shape tables on a building that doesn't scroll as your man climbs up. Thus the man climbs to the top, then is immediately reset to the bottom. A counter on the side indicates the number of floors that he has climbed. The shapes lack any solid filling or color, and only appear as indistinct outlines against the building.

The original game had a number of hazards such as closing windows, men dropping flower pots out of windows, a bird dropping turds, and an ape. The closing windows, the bird, and the ape have been preserved. The programmer added window washers that must be avoided and a senseless earthquake that occurs often and hurls you off the building. It is probable that you will never reach the top, especially since you only have one man. The animation of your man plunging to the ground, splattered and bleeding, is good, but becomes repetitious after extended play.

The keyboard control is easy to master. The R and I keys move the arms, and the A and L keys allow you to activate sliding motion to the left or right, while the space bar actually moves the player sideways. Some of the other keys produce some very poor and useless graphics and they should have been masked out. The game, which is very difficult to program and generally not suited to the Apple because of its lack of fine scrolling hardware, should have been left to much more capable hands. This program appears to be compiled Applesoft and, frankly, does not make the grade of a quality game.

FIREBUG

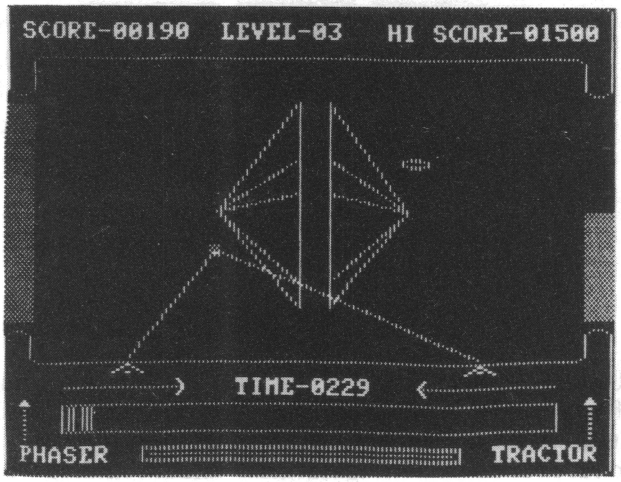
Company: Muse Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

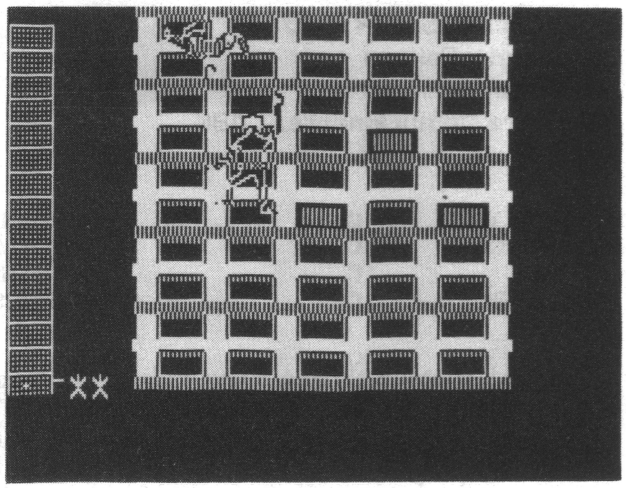
OVERALL RATING	C	CONTROLABILITY	D+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C+
CREATIVITY	C+	CHALLENGE	C	VALUE FOR MONEY	C
GAME DEPTH	C–	GRAPHICS	C–	HOLDS INTEREST?	C

Becoming a successful arsonist is the goal in *Firebug*. The object is to burn down a five story building from the top down and escape alive. You begin on the fifth floor where you lay a burning fuse as you guide your man about the maze of rooms and hallways. Scattered about the floor are a number of blue gas cans. These cans can be moved closer to the walls either by picking them up and setting them down near walls, or by simply knocking them over, spilling gasoline as you lay your fuse. The important thing is not to trap yourself by the burning fuse or spread fire, or you will make an ash of yourself. When you have finished setting the blaze, and the floor is burning fiercely, you dash down the fire escape to the next floor. Points are awarded for the amount of damage inflicted after each burning floor.

The game is played on a Lo-Res display by either joystick or keyboard control. It is best to use a spring loaded joystick with adjustable trim pots so that the firebug moves properly in all four directions. Control is somewhat unresponsive and difficult at best. The skill level can be varied by adjusting the length of the fuse. A long fuse is both easier and safer, but a short fuse gives you larger bonuses. The Lo-Res graphics are colorful and suitable for a blazing fire, but a blob for a character lacks the sort of idenification that children expect in an arcade game. Well, for ethics, it is only a game for fun.



HIGH ORBIT



HUMAN FLY

HIGH ORBIT

Company: Gebelli Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: *Disk**

OVERALL RATING	**B**	CONTROLABILITY	**B+**	ERROR HANDLING	**N/A**
GAME CONCEPT	**B+**	SKILL INVOLVED	**C**	DOCUMENTATION	**B**
CREATIVITY	**A–**	CHALLENGE	**C+**	VALUE FOR MONEY	**B**
GAME DEPTH	**C**	GRAPHICS	**B+**	HOLDS INTEREST?	**C+**

High Orbit is a rather imaginative and unique game where the object is to build space stations from nodules sent up from Earth. The nodules are picked up and positioned on top of one of the rotating station points with a tractor beam. You have to be quick, because the tractor beam only has a limited amount of energy before it has to be re-energized. If you position the nodule successfully, the station crew will take over with their own tractor beam. When all nodules are in place, the station, in a beautiful geometric graphic display, moves into position to be energized. This final step is accomplished by moving another nodule into the center, then zapping that nodule with your phaser.

While constructing a space station sounds like an easy chore, you must guard the station from enemy alien craft that wreck parts of the station and kill the crew. You are armed with a phaser. Unfortunately, patrolling the area takes valuable time, and time in this game is not a luxury. You only have a thousand units of time before the mission is aborted. However, if you succeed, the crew will abandon it and the station will be launched into high orbit. Then you must protect the crew while a shuttle picks up the crew for a return to Earth. Your next mission is to build an even larger station with one additional node.

The game's skill level can be considerably adjusted. You can start with a space station consisting of only three nodes, or one that has over ten. Although this game can be played with either keyboard or joystick, joystick control is definitely recommended.

While the game itself at first appeared to be rather esoteric both in concept and graphics, it soon caught on among the neighborhood children. The graphics, although mostly colorful geometric shapes, are stunning when the space station is launched into deep space. As a whole, the game combines the necessary shoot-'em-up aspects of arcade games with one's tinkertoy builder's instinct to make *High Orbit* a very enjoyable game, but only offers a challenge at the highest difficulty settings.

BAKER'S TRILOGY

Company: Softape
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C–	CONTROLABILITY	C+	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	D+
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C–

This disk contains three of Steve Baker's Hi-Res games. BUBBLES is a variation of the familiar Asteroid game. Each bubble when hit breaks into smaller bubbles. There are four sizes, the smallest about dot size, which is difficult to hit. The gun which can be aimed by paddle control is stationary in the center. This game is, well, so-so.

In the game of BURNOUT, the object is to steer a four speed race car down a straight track without colliding with one of several robot cars. You're scored for the number of seconds your car survives. Control is via keyboard; arrow keys for steering, number keys for speed. The game sounds simple but the computer cars attempt to box your car into a collision. The strategy is to keep shifting speeds to avoid them. Can be played with five people, each taking turns. Individual scoring. Good game.

PLANETOIDS is an interesting variation of the asteroid type game. The object is to shoot the planets apart before they collide with you and to dock with a star base that appears at random for only a few seconds. Your ship is steered and thrust-controlled with one paddle. The guns continuously fire automatically . Graphics and sounds during explosions are cleverly different than most other shoot-'em-up games.

SNAKE BYTE

Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B	VALUE FOR MONEY	C
GAME DEPTH	B–	GRAPHICS	C	HOLDS INTEREST?	B

Snake Byte is a rather challenging keyboard controlled game where the object is to devour apples with a steerable snake. But as the snake consumes each apple, it grows longer. Soon you have a snake with a body so long that it becomes a challenge to maneuver without running into the snake's tail. The game begins with ten apples, but if you don't eat fast enough, you're penalized with extra apples. Once you have eaten all of the apples, you advance to the next maze level.

The upper levels, which have barriers or internal walls, are much harder. There is an option to add either one or two bouncing plums to the game. The added challenge is to avoid hitting the plums with the snake's head. A collision costs you one of your three snakes.

The keyboard mode is very responsive. There is a choice of two keyboard modes. The I,J,K, and M keys can control the four directions. The trouble with this mode is that it is easy to double back on yourself and lose a snake. The two arrow keys, which control clockwise and counterclockwise turns, is the easier method. The graphics are adequate, nothing fancy, and even the apples just look like * signs. *Snake Byte* seems to be more challenging than *Viper*, another game using this theme that we reviewed earlier.

SUICIDE

Company: Piccadilly Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	**F**	CONTROLABILITY	**C**	ERROR HANDLING	**N/A**
GAME CONCEPT	**D–**	SKILL INVOLVED	**D**	DOCUMENTATION	**C**
CREATIVITY	**F**	CHALLENGE	**D**	HOLDS INTEREST	**F**
GAME DEPTH	**D**	GRAPHICS	**D**	VALUE FOR MONEY	**F**

Suicide's premise is that people, while attempting suicide by leaping from a tall building, must be saved by bouncing them back into the air with your paddle. The challenge is that there are many falling bodies that must be saved simultaneously. Some of these jumpers change their minds at the last moment and don't require your assistance, as they float upwards on their own accord. You have a limited amount of time to save as many jumpers as the computer generates. There are five progressively harder levels.

The game is not exactly a winner among the juggler varieties on the market. It possesses only fair graphics on the left half of the screen (the right side is blank). There isn't even a building displayed from which the self-destructors are presumed to leap. Trying to save suicidal, bouncing bodies, and generally not succeeding (at least in this contest), is not one of this reviewer's favorite pastimes.

FLYWARS

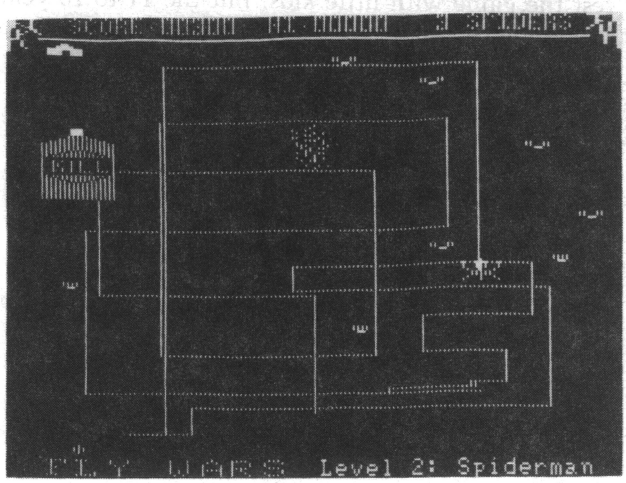
Company: Sirius Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	**C–**	CONTROLABILITY	**B**	ERROR HANDLING	**N/A**
GAME CONCEPT	**C+**	SKILL INVOLVED	**C–**	DOCUMENTATION	**C**
CREATIVITY	**C–**	CHALLENGE	**B–**	VALUE FOR MONEY	**D+**
GAME DEPTH	**C–**	GRAPHICS	**C**	HOLDS INTEREST?	**C–**

As a spider in *Flywars*, the basic goal is to trap flyfighters in your web. Each time you destroy one, a caterpillar appears. Upon trapping the caterpillar, a cocoon appears at the bottom of the screen, which must be pushed to the top of the screen, where it is disposed of in an accumulation of points.

It is a relatively simple game played with either keyboard or joystick control. But once level two begins after 200 points, a spray can of Raygunite insecticide appears frequently with its noxious vapors aimed squarely at the spider. (With the spider's web as its only weapon, the only safe course is to be alert and avoid the spray.) By the time you reach level three, a web munching beetle adds excitement to the foray, and an occasional caterpillar drops a lethal bomb. If the web becomes too cluttered, you only have to turn off the web, exit the screen, and begin with a clean slate. While *Flywars* is not your usual type of arcade fare, it offers just enough excitement and challenge to be of interest.



FLY WARS

VIPER

Company: RDA Systems
Language: Machine
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	B	ERROR HANDLING	N/A
GAME CONCEPT	B	SKILL INVOLVED	B–	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	C+	GRAPHICS	C–	VALUE FOR MONEY	C–

Viper is a keyboard-controlled game in which the object is to catch elusive, scurrying little mice via a moving snake. You must do this without running into yourself or any obstacles or the screen's border. The snake grows longer with each mouse devoured, so that after a while it becomes a real challenge to maneuver this burgeoning reptilian creature around the screen without running into its own, ever-growing tail.

This reptile-and-rodent, chase-and-gobble contest has numerous difficulty levels. You can vary the speed of the snake or the mouse, or even add a series of obstacles. There are two keyboard control modes. A choice of four keys set in a diamond will control the viper's direction or the two arrow keys will turn the viper left or right. The latter set of controls are the easiest to work with since it prevents one from doubling back on one's path. The game isn't overly exciting and doesn't possess particularly good graphics, but it might appeal to someone who wants to develop their hand-eye coordination skill, or is down on mice and big on snakes.

ROACH HOTEL

Company: Micro Lab
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $34.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	D	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	D	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	D
GAME DEPTH	C–	GRAPHICS	C	VALUE FOR MONEY	D–

Roach Hotel is obviously a children's game where the object is to stomp on roaches who attempt to enter a hotel. This is accomplished by a paddle-controlled foot. The game is complicated by a spider that attacks your movable foot at the top of the screen. If you can kill 10 spiders before 16 roaches occupy the hotel, all of the roaches inside are exterminated. If not, you lose one of your three feet.

The game is very easy at first. Roaches crawl along in single file, moving very slowly. It is easy to position a foot that falls and crushes whatever is underneath when the paddle button is pressed. As the game progresses, the roaches appear more rapidly while deadly spiders hinder you progress.

This reviewer frankly didn't test the game with little kids, but the 11 to 15 year old age group rated it thumbs down. It's nice to play once or twice, but $34.95?

PUZZLE & STRATEGY GAMES

CROSSWORD MAGIC 2.0

Company: L&S Computerware
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $49.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	**A**	EASE OF USE	**A**	ERROR HANDLING	**A–**
GAME CONCEPT	**B**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**B+**
CREATIVITY	**B**	CHALLENGE	**N/A**	HOLDS INTEREST	**A–**
GAME DEPTH	**N/A**	GRAPHICS	**B+**	VALUE FOR MONEY	**B+**

Crossword Magic 2.0 presents a fun way to create crossword puzzles. The puzzles that it creates from lists of words that you provide are of the British format, rather than the kind you are used to working in newspaper columns. These puzzles, lacking the tight interlocking symmetrical form, have many more black spaces because the words, although interconnected, are more strung out. The puzzle can range in size from a 3x3 square to a 20x20 square.

The package consists of a double sided disk: the maker program on one side, and the player disk on the other. The process of making a puzzle is both interactive and creative. One can arbitrarily choose a theme, enter words one at a time, and watch the computer instantly insert the word in the puzzle. The puzzle can be a fixed size, or can be expanded to fit in new words. If the computer cannot use the word immediately, it stores the word for later use. Because the process is interactive, you can choose words as you go, either to connect to the chain of linked words or to bridge a gap. The computer is quite capable of filling in the letters for SPAN if the P and A were missing, or the P and N were missing. There is no guarantee, however, that the computer won't decide that SPAN should cross the word EGRESS instead. In this latest version, you can press the R key to Reposition the word for another possible fit, if one is available. You can also delete the last word should you make a mistake.

After you have inserted all the words in the puzzle, its clue time. This is where children have the most fun. You can dream up strange or humorous clues. You're only limited by your imagination. When the clues are finished, the computer will step through them, enabling you to edit any errors.

Puzzles can then be saved to either the maker disk, or to any other formatted storage disk for later play. They can also be dumped to any printer (supports 30 printers and 14 interface cards) that has graphics capabilities. The printout contains the blank puzzle, with clues listed below and the answers at the very bottom. The answers can be clipped before distributing for player solution.

The player disk allows you to solve a puzzle. Puzzles are first transferred to this disk from the master disk. You use the arrow keys for movement over the crossword pattern; the space bar toggles the direction. When the cursor is on any black or filled-in square, the clue is displayed. You can type the answers in, or correct any mistakes. The computer will keep track of your errors. If you finish, or choose to peek at the solution, the correct answer will be identified with inverse lettering, with the errors in normal lettering.

Crossword Magic is exceptionally easy to use, fast and suitable for both home and educational application of all levels; it seems particularly useful for children who rebel at any program that teaches verbal skills. The documentation includes a large section of tips and techniques for forming better puzzles. The program provides an attractive display and user interface, and without a doubt is the best crossword puzzle program available. Considering the difficulty of the algorithm, it is an amazing feat in programming.

ASTRO-WORD SEARCH

Company: Program Design Inc.
Language: Applesoft
Hardware Requirements: 16K

Department: Entertainment
Sugg. Retail: $14.95
Availability: 6
Disk or Tape: Tape

OVERALL RATING	**C–**	EASE OF USE	**C+**	ERROR HANDLING	**B**
GAME CONCEPT	**C**	SKILL INVOLVED	**C**	DOCUMENTATION	**C**
CREATIVITY	**C–**	CHALLENGE	**C**	HOLDS INTEREST	**D+**
GAME DEPTH	**C–**	GRAPHICS	**N/A**	VALUE FOR MONEY	**C**

This is an "imbedded" word game. Its object is to find the names of countries that are mixed up in a maze of letters. The words can be found either horizontally, vertically, diagonally, and forwards or backwards.

JABBERTALKY

Company: Automated Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B+
GAME CONCEPT	B–	SKILL INVOLVED	N/A	DOCUMENTATION	B+
CREATIVITY	B	CHALLENGE	N/A	HOLDS INTEREST	B–
GAME DEPTH	N/A	GRAPHICS	N/A	VALUE FOR MONEY	B–

Not long ago, OMNI magazine published a short story purported to be authored by a computer — as certainly appeared to be the case, in this reviewer's opinion. The quality wasn't the point in question, however; the fact that it had been written by a computer at all was the eye-opener. JABBERTALKY can do something very similar, although on a much smaller scale. This little gem of a package can generate a random sentence, with a syntactically-correct general structure, among other things. As to relevancy of meaning...well, "applied creative interpretation", as someone once said about about the state of certain software documentation, is the best assessment that can be made of its content.

The package contains a sentence display generator (FREE VERSE), two word games (ALPHAGRAMMAR and CRYPTOGRAMMAR) and a do-it-yourself random sentence builder (JABBERGRAMMAR), all included as four options on the primary menu. The first option, FREE VERSE, will present a scrolling display of "pithy pearls" extracted at random from one of eight difficulty levels. Sitting in front of the CRT and attempting to make meaning of such as "SERENDIPITY IS THE MOTHER OF VENGEANCE", "YOU COULD NEVER ENTICE THE ONE YOU HATE", "A FRIGID LOVER IS A JOYOUS VICTIM" may not be one's idea of a profound pasttime; however, it does provide an idea of some of the grammatical structures available at different levels when you decide to create your own syntax patterns. Although coinages appear to be used liberally in constructing the system word list (BEAMISH, WITHERPRONE, SYNCHRONICITY), they almost seem to make sense when used in context. The only item apparently missing from this repertoire: "T'WAS BRILLIG AND THE SLITHY TOVES".

ALPHAGRAMMAR, the second option, restores a semblance of normalcy after prolonged exposure to FREE VERSE. This game consists of choosing and inserting given letters in a sentence pattern. Each letter in the pattern is represented by a white block. After choosing a letter from a displayed list, a blinking square cursor is positioned over a selected block in the pattern for inserting the letter. If it is the correct choice, the letter will be substituted for the white square; otherwise, it will be displayed below a timer, which keeps track of how long it takes you to fill in the sentence if you are playing against an opponent. This reviewer took 10 minutes to decipher the following at Level 1: "YOUR PAL CAN TICKLE YOUR SWEETEST PLAYMATE"; not too good by the system's standards. Unfortunately, the solution was attempted based upon some kind of contextual meaning. Live and try to learn.

The third option, CRYPTOGRAMMER, is a true cryptogrammic game in that each letter presented in a displayed pattern represents another letter. As in ALPHAGRAMMAR, you are timed while trying to unscramble a sentence. This challenge can really become hairy at higher levels of play, however. Letters within a word can be completely reversed (i.e., KROW = WORK), spaces can be interspersed in long words, and vocabularies become very polysyllabic and, well, inventive (remember WITHERPRONE?). It's a good idea to jot down the original cryptogram on a piece of paper at the higher levels to keep track of substituted letters, as your correct letter substitutions are not designated in the pattern. Confusing the valid ones with the bogies in the sentence at Levels 7 and 8 is a distinct pain. What ended up as a real drop kick was this literary profundity, however: a Level 1 solution to FN IJCSX WDPC EUJDA DA FN WCSJO WDPC FUC ZJCSFZAF KSW NT RNV turned out to be TO DREAM LIKE CHRIS IS TO LEARN LIKE THE GREATGST PAL OF JOY. Yes, that's "GREATGST" — this misspelling in the internal adjective list didn't exactly put this translation in the category of a warmer-upper.

The fourth and last option, JABBERGRAMMAR, is the heart of the system. With this word builder/editor/utility, you can create new vocabularies, read existing ones, or save ones that you've already created (although the documentation doesn't specify that you have to remove the write-protect adhesive label from the program disk to save a vocabulary list. This is not too swift in itself, since the disk is non-copyable and, by writing on it, any number of fatal things can occur to destroy the only copy.). The word lists can consist of many types, including adjectives, proper names, nouns, etc. — all within different levels. These lists are used to insert appropriate words at random within sentence syntax patterns which you may also optionally design. Thoughtfully, a print option is included for producing a hard-copy of the vocabularies. In all, over 50 menu options are available — a sizeable number for a game, albeit a "programmable word game". The pay-off for this mental expenditure may seem somewhat questionable: the generation and/or resolution of aforementioned whimsical phrases. But, Holy Moly, the infinite varieties contained therein!

Even more whimsical, in many respects, is the documentation. Guess who takes you on a trip through JABBERTALKY-land? Even Alice, who, in sequence, delights in each discovery of a new aspect among the four options, becomes a little too cutesy. The effect is one of trying to figure out how to use the system and play the games without getting caught up in the chimerical dialogues between Alice and The Jabbertalker. Overall, the 31 pages of documentation is comprehensive and certainly novel. A well-organized Command Symmary and Work & Syntax

List is included at the end of the booklet. The best bet is to run the programs in sequence with the narrative, then venture on your own from there.

Automated Simulations, under its category of Mind Toys, has certainly taken a creative approach in providing a unique and challenging word game. At the very nominal price of $29.95, this package will provide many word-fanatics with many hours of random phrase combinations and certainly a savings on cryptogram puzzles otherwise purchased at the magazine racks.

OIL RIG

Company: CPU Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	B–	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	C–	DOCUMENTATION	C–
CREATIVITY	C	CHALLENGE	B	VALUE FOR MONEY	C+
GAME DEPTH	C+	GRAPHICS	C	HOLDS INTEREST?	B–

Oil Rig is a business strategy game that effectively simulates fast decision making because it operates in a speeded up real time environment. The strategy is to gain enough money through the oil product's market to be able to afford the cost of prospecting and drilling for oil. Of course, if successful you will need ample cash for pipeline, tankers, trucks and an oil refinery. The goal is to strike a gusher, become a multi-millionaire, and join the Tycoon Club.

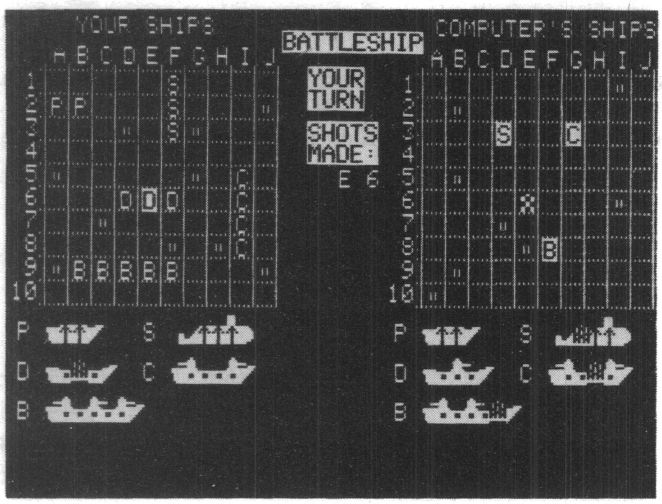
In the beginning you buy and sell oil products for profit. A master board displays the current prices for six products. Prices rise and fall monthly due to seasonal price fluctuations, OPEC, government regulation, and inflation. There is some predictiblity to these changes; although the amount of fluctuation is random. Since the board takes nearly ten seconds to update the six products, if you are prepared you can execute a buy or sell order on the last item based on the price change of the first. Prices tend to fluctuate widely from $10 a barrel to $300, although I once saw petrol products hit $525 a barrel. It isn't hard to make enough money to proceed with the rest of the game if you don't try to buy more barrels than you can afford. One of the bad features of this game is that you can easily go bankrupt for making a mistake. Instead of checking your bank balance and informing you that you can't make the purchase, the game bankrupts you suddenly. You can be 21 years into a 40 year game and the game ends because of a typing error. It is very frustrating.

Prospecting requires ownership of a drill rig. This can be bought with other oil equipment anytime during the game. Prices change monthly and rise and fall with the market. The fee is $1000 for a core sample. A Hi-Res map is displayed and you position your location with the paddles. After pressing the paddle button, a message is displayed showing the probablity of striking oil along with the X and Y coordinates which you must remember for drilling.

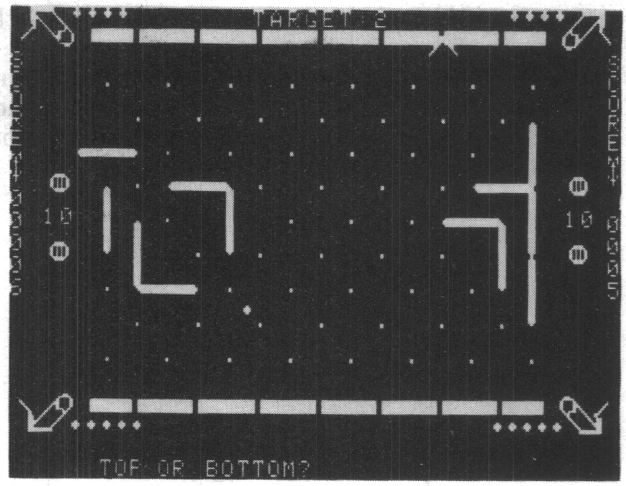
Drilling is somewhat arcade style. A moving pool of oil traverses the screen. You must position the drill rig with the paddles, and time the drilling operation so that the descending pipe strikes the oil as it floats past. A high core sample usually yields a large, shallow pool that costs less to drill for. A low core sample means a small and deep pool of oil that is nearly impossible to hit. Dry wells cost you nearly $6500.

If you strike oil, I assume you need some or all of the following items to operate your business at a profit: refinery, pipeline, tanker, truck, and platform. The relationship of all of these items is not explained in the documentation. It is highly likely that you can be running your oil operation at a negative income. The documentaion hints that it is time to drill again. The times I've played it, I had four oil refineries explode with penalty costs of $15,000 each time. I have no idea if lacking a platform had anything to do with the incidents since the cost of a platform never dropped below $100,000 throughout the 38 year game. Moreover, there are always random incidents that occur throughout the game. You should always have an ample cash reserve to last through an oil worker's strike or, as another example, an explosion on one of your rigs. Once your money is gone, you're bankrupt.

Overall the game has merit. It is fun to play if you like real time strategy games. It is the type of game that eggs you on despite the frustration with bankruptcy because you want to see if you can strike oil at least once before you tire of the game.



SUPER SEA WAR



RICOCHET

PRESIDENT ELECT

Company: Strategic Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	D	EASE OF USE	D	ERROR HANDLING	B
GAME CONCEPT	A	SKILL INVOLVED	D	DOCUMENTATION	B
CREATIVITY	D	CHALLENGE	D	HOLDS INTEREST	D
GAME DEPTH	C	GRAPHICS	D	VALUE FOR MONEY	D

PRESIDENT ELECT is a political simulation game, which like a true politician, makes great promises and is agonizingly slow to deliver anything. There are bells, whistles, and options galore in this one-to-three player game in which you manage up to three presidential candidates in the final nine weeks before the national election. You may choose from six historical election years, using actual socio-economic conditions, or use the same six years under non-historical settings, or project into the 1984 election year; use real candidates and their beliefs, run Goldwater against Reagan or LBJ against Carter, mix and match them as you will, create your own candidate and run him as a Republican, Democrat, or Independent against whomever you wish. You can even create your own set up and let the Apple manage all the campaigns; however, the preset 1980 demo game takes 8.5 minutes for each of the nine weeks.

Once all these neat preliminaries are out of the way, it's on into a dull and repetitious set of nine turns, (i.e., weeks). This consists of simply allocating the available campaign funds into campaigning (in this case, the spelling IS correct) on a national, regional, or specific state basis. You may also elect to make campaign trips, at home or abroad, or agree to have a debate with your opponent, which are included in separate budget categories. The actual play of the game is very easy, due to extensive prompting and good error trapping. Just specify the amount to be spent when each element is presented. If you choose to debate, it's a matter of specifying what percentage of your argument or rebuttal period is to be spent on different categories, such as addressing the issue, criticizing your opponent, being indignant or simply killing time; no, you don't even need to read the questions, which are really quite relevant.

After each turn, at which point, mercifully, the game could be saved, the only graphics in this program appear-a rather poor map of the USA; after only 70 seconds, the map is color-filled! The cartographic display shows those states that are committed, leaning to, or are too close to call for each candidate, and then its back to parceling out more money. Believe it or not, you can even watch the election results pour in in real time — it takes over four hours. Watching this grass grow is interspersed with the ultra-slow map coming up whenever another state is projected to be won by a candidate. Alternatively, time can be sped up to two faster modes, one of which proceeds to all of the final returns, with one map.

PRESIDENT ELECT may be nicely-modeled and, although it may provide a fine degree of simulation, it is difficult to maintain interest due to the dullness of play. It could, however, be put to good use as a youngster's primer in budgeting with the secondary benefit of learning what it takes to be elected president and the financial expenditure involved. As for me, I'd prefer to use the equivalent amount of time with the Apple to balance my checkbook and then watch the REAL grass grow.

RICOCHET

Company: Automated Simulations
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	B–	CONTROLABILITY	B	ERROR HANDLING	B
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	B–	CHALLENGE	B+	VALUE FOR MONEY	B
GAME DEPTH	C	GRAPHICS	C+	HOLDS INTEREST?	C+

Ricochet somewhat resembles bumper pool played by two players or one player against the computer on a frictionless table. Each opponent has two-five shot launchers set in each corner. There are also two bumpers, or goals, set midway between them, and six deflectors initally positioned in a triangle to guard the player's goal. The entire field is gridded to make calculations easier.

A player has the choice of launching a ball, or rearranging his defensive deflectors. During rearrangment, all deflectors must be moved in the same direction for that turn. When a ball is launched it travels until it either reaches the playfield boundary, or strikes a deflector and flips it from one orientation to another. In each case the ball ricochets at a 90 degree angle and continues until it leaves the playfield at the left or right sides. When the ball strikes a launcher, that launcher is put out of commission for two turns.

Points are scored for striking bumpers, launchers, and deflectors of either player. The game ends when the player runs out of launcher balls. A match consists of a group of games. What is interesting is the handicaping that the computer does to even out the match. At the conclusion of a game in a match, the bumpers on the winner's side of the board increase in value, thus the next game is easier for the loser. The average match takes between ten and thirty minutes, and in addition, a clock is used to penalize players who take too much time in choosing their moves.

The game has a number of variations including extra bonus targets. In all there are five variations with the fifth lacking the customary grid. While the game at first appears to the novice to be a game of random luck, like chess this game requires the ability to think and plan moves far ahead. The ricochets can be predicted, although they are difficult for the average player to visualize after several bounces, especially when deflectors shift orientation from vertical to horizontal. Like most strategy games, *Ricochet* requires a lot of experience, and skilled players will find it a real challenge.

SUPER SEA WAR

Company: Micro-Ware Distributing
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $13.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	B	EASE OF USE	B+	ERROR HANDLING	A–
GAME CONCEPT	B	SKILL INVOLVED	B	DOCUMENTATION	B–
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	C+
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	B

SUPER SEA WAR is a nicely done Hi-Res implementation of the game Battleship; the same one kids play on paper in school. This version pits you against the computer.

For those who don't know this classic game, two players hide their naval fleet (five ships) on a grid-formatted playing field or board. Each player takes turns firing a salvo at one of the squares. The other player informs the salvo shooter if he has scored a hit on one of the defensive player's ships. Once a ship is pin-pointed in this fashion, the offensive shooter tries to sink the entire ship by striking all squares that the ship occupies. Battleships occupy five adjacent squares, while PT boats take up two squares. The winner is the first to sink his opponent's entire fleet.

This version includes the original game plus two advanced variations. In one variety, you have the use of both guns and a limited number of missiles; in the most advanced, the offensive salvo shooter can fire one missile or one gun from each of his own ships. Thus, one can take up to five shots per turn, since there is an unlimited supply of ammunition and missiles. If you liked this game as a child and have nobody to play against, the computer makes a good opponent.

CARTELS & CUTTHROATS

Company: Strategic Simulations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	A–	CONTROLABILITY	A	ERROR HANDLING	A–
GAME CONCEPT	B	SKILL INVOLVED	A–	DOCUMENTATION	A
CREATIVITY	B	CHALLENGE	B	HOLDS INTEREST	B
GAME DEPTH	B+	GRAPHICS	B	VALUE FOR MONEY	B+

CARTELS & CUTTHROATS is a business management simulation game that is suitable for high school and college business administration courses. The game can be played with up to six players, five of which can be computer players managing their own companies.

Each player, acting as company president, is expected to make decisions on eight aspects of company operation – units of production, units of raw material to purchase, selling price, advertising and research costs, new loans and whether to build new factories. Memorandums advising you of possible wage strikes, availability of new loans at better interest rates, time saving production costs, etc., must also be acted upon.

Numerous economic and company reports are available to help make decisions. These reports can either be viewed by all players simultaneously, each player individually during his turn, or sent to a line printer for classroom or homework distribution. The game can also be saved at the end of any quarter.

The summary news wire lists the Gross National Product and Consumer Price Index in addition to the number of units sold, price and total revenues for each company in the industry. Each player additionally receives a profit and loss statement, a balance sheet, sales report which covers sales, performance and consumer preferences, a production report explaining costs and inventory, and finally a market summary comparing all the company's sales. A year end annual report is generated to enable you to compare your success or failure for each business quarter.

Numerous business scenarios can be chosen that range from beginning to advanced. One can choose a business climate where the economic savings, inflation and raw material costs are relatively stable or one where prices swing dramatically. One can choose a product type that ranges from necessities through mixed goods to luxury goods. Also, the levels of chance can be specified. In addition, players can choose their level of difficulty. A beginner is not penalized against advanced players, but is actually given hints to improve his profits.

The game is excellent for developing business strategy since all the drudgery of calculations has been removed. It teaches through immediate feedback which policies are successful. The bottom line is market share and net profit.

The game was designed by a systems simulation expert and a holder of a Masters in Business Administration. The model includes the relationships between economic environment, production management and market forces. It includes the laws of supply and demand, price elasticity, market price equilibrium, advertising and product differentiation's effect on sales, inflation, the GNP, CPI and disposable income factors.

CARTELS & CUTTHROATS is exceptionally well presented through extensive documentation which serves as a primer for business theory. It is worth reading as a solid base for making your own decisions during the game. All reports are presented in a pleasing font on the Hi-Res screen. They are readable and well-formatted. In all, an excellent game.

GOMOKU

Company: Softape
Language: Applesoft & Interger
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 7
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B–	HOLDS INTEREST	C
GAME DEPTH	C–	GRAPHICS	C	VALUE FOR MONEY	C

The object of GOMOKU is to place five of your markers in a row either horizontally, vertically or diagonally on the board provided. Playing against the computer, you choose from the following levels: beginner, intermediate, or advanced. The aforementioned procedure may seem simple, but don't be deceived by the directions. The player must play defensively as well as offensively against the computer. The program provides a challenging game by forcing you to set up the appropriate moves. GOMOKU is a game that provides much mental stimulus.

WALL STREET

Company: CE Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C	EASE OF USE	A	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	B	CHALLENGE	C	HOLDS INTEREST	B
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C

While there are several quite good Public Domain stock market programs, this one offers several unique features, such as selling short, inside tips, leverage, and the ability to borrow against one's net worth. Stock Market permits one to nine players to race each other in being the first to parlay his initial $10,000 worth of investment funds into $1,000,000 by buying and selling on the market each day of the trading week. The solitaire version isn't played against the computer, but can nevertheless be an interesting game. Any game may be saved at the close of business on each Friday, after all loan interests, tip fees, and brokerage commissions have been paid off.

This all-text game presents a "daily" financial paper consisting of five pages, plus an additional page for each player for specifying his portfolio and current status. The four pages of stock listings are grouped into six types of industries, and can be printed on hard-copy on a daily basis so that players can plan their strategy in advance; a good idea, since one indecisive player can slow the game down to an agonizing crawl. Players alternate in making their decisions, always getting at least one chance to buy or sell during each day, and usually enough opportunities to complete all the transactions they wish. (The game would be better-structured if each player made ALL his transactions before passing control to the next player in order to speed play.)

The only significant shortcoming in this otherwise pleasant-enough game is that, in a one-or-two person game, a player has too much leverage with the stocks that he has bought or sold and, therefore, can seldom go wrong. On the other hand, in a multi-player game, such leverage and the 100% of net worth borrowing power will soon result in an aggressive player's winning a permanent seat on the stock exchange, while the others must turn in their keys to the executive washroom.

CROSS CLUES

Company: Science Research Associates
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	C	EASE OF USE	B–	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	C	HOLDS INTEREST	D+
GAME DEPTH	C	GRAPHICS	C+	VALUE FOR MONEY	C–

CROSS CLUES is a two player crossword puzzle game in which players compete to uncover hidden words in an already formed (9x9) matrix. Each player is given a chance to guess a word. If he is right he can try again. If he is wrong, and any of his correct letters remain in place and, in addition, he must choose a consonant clue which the computer will provide if the letter exists in the puzzle. Since the object is to score 21 points first, it isn't advisable to choose consonant clues that might help your opponent.

There is an adjustable time limit to each player's turn. Limits can be adjusted at the start to allow beginners and experts to challenge each other. If the computer, acting as referee, believes one player is too good, it will often cut his time in half.

The user interface is keyboard-controlled, with the period and comma keys used for moving two arrows, one for horizontal, the other for vertical, to the starting position of each word. An asterisk shows the position of each letter to be typed. The backspace arrow erases a mistyped letter.

There are fifty puzzles on the disk. Unfortunately, once two players solve a puzzle and learn some of the words, the puzzle is useless for further competition. Overall, this game is ideal for teens or adults who want to compete in an intellectual game requiring both skill and luck.

ROBOT WARS

Company: Muse
Language: Machine & Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95 (Est.)
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	C	ERROR HANDLING	B
GAME CONCEPT	A	SKILL INVOLVED	A–	DOCUMENTATION	B+
CREATIVITY	B+	CHALLENGE	A	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	C	VALUE FOR MONEY	B

ROBOT WARS introduces the fascinating concept of programming a robot to battle against other warring robots. Like the ancient Roman gladiator matches, ROBOT WARS is their late 20th-century equivalent.

The robot battles become the culmination of one's programming ability. After the robots are sent into battle, the player no longer has direct control over the robot's battle tactics. Each robot's micro-computer brain, which can hold a maximum of 256 instructions, has been previously programmed with a battle strategy plan. Once on the battlefield, the robots (from 2 to 5 in number) rotate turns, each executing a single robot language instruction. Obviously, the winner is the robot that runs the most effective battle strategy program.

A typical battle takes place on a walled-in square field 256 units long per side. Thus, the only ultimate escape is death, with only one winner left. The two waiting robots, represented by Hi-Res figures that show the positions of the radar and gun port, begin scanning with their radar as they move to some arbitrary position on the field. Robot A spots the other and fires a shot. Robot B, sensing immediate damage, begins moving out of fire towards a wall while its radar is still scanning for his opponent. The first robot begins driving for Robot B's last known position in an effort to cut down the scan time on its radar. B, lacking the intelligence to avoid the wall, inflicts more damage to itself upon collision. However, it sets its radar on a short scan, finds A and fires. The battle continues until one or the other is damaged 100% and a winner is declared. Scoring points are added or subtracted and logged in the robot's code. Robot battles can be dull or exciting, depending on the ability of the robots. But this wasn't meant to be a spectator sport. Only players personally involved would enjoy watching two poorly designed robots represented as a Hi-Res square and circle shoot at each other.

Each robot has an accumulator in which math is performed, a pair of index registers to help control the program flow, 26 memory registers and 7 input/output registers. These last registers store information like X and Y position, X and Y speed, the aim angle of gun and radar, amount of damage and length of time before a shell explodes. There is also a random number, generator register. The language is somewhat like BASIC's syntax, but in logic is more like machine language. Statements like 0 TO SPEED V puts 0 in the vertical speed register. B TO RADAR means to take what is in memory register B and put in the RADAR register. IF RADAR – 90 GOTO TRAVEL means if the radar register is less than 90, then jump to a location in the code starting with a label called travel.

The code is entered in a full-screen text editor. It can be saved to a source disk initialized by this program. The source code is then assembled with a cross-complier into machine language instructions. One can watch the assembly and control the speed by turning the paddle.

The robot is then tested on a test bench before being placed in battle. Here you can watch the micro-computer in action, speed it up, slow it down, stop it, and look at any of the registers. The bench displays on the right side of the screen the counters for horizontal and vertical position and speed, radar, gun aim, shot fired, damage, accumulator, program counter and which register is being watched. This last item can be changed to suit your test. The paddle buttons are used to simulate the presence of another robot and to simulate damage to your robot in an effort to see how your robot will react in an actual battle situation.

The program's documentation is lengthy but quite clear and understandable. The author provides some simple robot examples for you to study but if you watch these fight you will soon realize that a good robot is much more complex. There is also a list of spare parts suitable for using in your first few robots.

ROBOT WARS has a two-fold purpose. Of course, it is also meant to be a game, but it is also intended to be a tool for introducing and teaching an introduction to assembly language programming. I'm sure that even those that know little programming but are enthralled by robots will make an attempt to learn the language. However, be advised that this program, especially for beginning BASIC programmers or non-programmers, is not easy to use. Assembly language and Robot language requires exacting and careful planning. Finding and ridding mistakes even with the help of a good debugger like their test bench is not a simple task when values are stored and used in various memory and operating registers. I have no doubts that this is an excellent program but I am also inclined to believe that many game enthusiasts will buy this language-oriented game and never use it after watching the demo robots, because they may find understanding and programming robots very difficult to master. It is not a simple shoot-'em-up game.

THREE MILE ISLAND (Special Edition)

Company: Muse
Language: Assembly
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	B+	SKILL INVOLVED	C	DOCUMENTATION	A
CREATIVITY	B–	CHALLENGE	B+	HOLDS INTEREST	B
GAME DEPTH	B	GRAPHICS	C+	VALUE FOR MONEY	B+

THREE MILE ISLAND is a game involving the complex simulation of a nuclear power plant. The object is to run the plant both safely and economically in a speeded-up, real time operation. As in any real simulation, problems occur and need fixing. Equipment in normal operation either breaks down or needs to be scheduled for repair. The backup systems need to be switched on-line. Inability to handle crisis problems due to your mistakes in operational procedure can easily lead to radiation leaks or even "Meltdown."

The game has many Lo-Res views of the system. These are real-time views which show news of the plant; on-off status of valves and pumps, coolant levels and flow in all pipes and systems, and internal radiation leaks. This updated version is done entirely in machine language, so that all views are now switched instantaneously rather than the fifteen or so seconds that it used to take to redraw each view. Displays also include status of operating pressures and temperatures, electrical demand and expected changes, plus operating profit and loss statements. There is a real-time clock that can be stopped for beginners who need time to respond to system changes like increased electrical demand.

This is a very demanding game which that requires a technical mind to understand. The documentation is thorough and explains clearly how an atomic power plant operates. There is a demo mode and a fast mode which allows you to view a meltdown from start to finish. This is one of the first and best simulations done on the Apple.

PICTURE PUZZLES

Company: Creative Computing Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C–	EASE OF USE	C+	ERROR HANDLING	B–
GAME CONCEPT	C–	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	D	CHALLENGE	B	HOLDS INTEREST	D
GAME DEPTH	C	GRAPHICS	B–	VALUE FOR MONEY	C

PICTURE PUZZLES turns any Hi-Res picture into a 60 piece puzzle with its pieces either interlocking or non-interlocking, male-and-female type squares (well, you know what I mean). The pieces can be chosen and positioned completely by paddle control. And if one makes a mistake, the piece can be removed easily and placed back in the pile. One also has the option of viewing the completed puzzle at any time.

This reviewer sometimes wonders why anyone would want to put together a jigsaw puzzle on a computer terminal. The mechanics of sifting through individual pieces by paddle control hinders ones intuitive feel of being able to scan a card table full of pieces for the correct shape and color. There is a mechanical feel that is completely lost using this program. Now...if the computer could put together a random puzzle by itself, then we might have something.

VALDEZ

Company: Dynacomp
Language: Applesoft
Hardware Requirements: 16K

Department: Entertainment
Sugg. Retail: $21.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C–	EASE OF USE	D+	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	D+
CREATIVITY	C–	CHALLENGE	C+	HOLDS INTEREST	D+
GAME DEPTH	C	GRAPHICS	D+	VALUE FOR MONEY	C–

VALDEZ is a computer simulation where one navigates a super tanker through the straits of Valdez to the Alaskan Harbor in order to pick up crude oil. Using engine speed, rudder control and a simulated radar screen one maneuvers his ship through the narrow passages, past oncoming super tanker traffic and floating icebergs. The simulation takes into account tidal flows, currents and ship dynamics. The simulation is keyboard-controlled and not in real time. The program should be reworked to use graphics screens instead of using text characters to form the display map.

MISSION ESCAPE

Company: CE Software
Language: Applesoft
Hardware Requirements: 48K

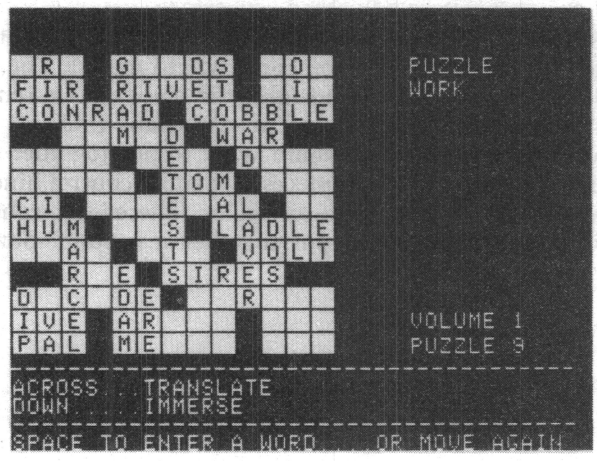
Department: Entertainment
Sugg. Retail: $24.95
Availability: 4
Disk or Tape: Disk*

OVERALL RATING	C–	CONTROLABILITY	C	ERROR HANDLING	C
GAME CONCEPT	B	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C–
GAME DEPTH	C–	GRAPHICS	C	VALUE FOR MONEY	C–

MISSION ESCAPE is a Hi-Res strategy game in which you attempt to escape from a ten-level, highly-guarded security station or prison. You're equipped with laser-absorbing armor, a laser gun, ten rapid fire charges, and ten missiles. As you advance into a level, you must defeat a squadron of storm-troopers, drones and robots.

The game is run partially in real time. You alternate turns with the computer; on your turn you have three moves or ten seconds, whichever comes first. The commands are all keyboard-controlled.

The game is definitely more strategy-oriented than the arcade type; therefore, you must understand how the computer opponent plays. The latter is explained thoroughly in the documentation. The game is fairly challenging, becoming more difficult as you advance from level to level. The five highest point scores are stored on the disk.



CROSSWORDS

CROSSWORDS

Company: Softape
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 7
Disk or Tape: Disk*

OVERALL RATING	**B**	CONTROLABILITY	**A –**	ERROR HANDLING	**A**
GAME CONCEPT	**B**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**B**
CREATIVITY	**C**	CHALLENGE	**N/A**	HOLDS INTEREST	**C**
GAME DEPTH	**C**	GRAPHICS	**B**	VALUE FOR MONEY	**B –**

The CROSSWORDS program allows the user a choice of playing any of 24 supplied Hi-Res puzzles or creating one's own puzzle for others to play. The puzzles on the disk vary from 12 to 15 squares each way. A cursor can be easily moved around the Hi-Res display grid to the top or left position of any word. The computer supplies a clue. You type your answer in the correct position on the puzzle.

Crossword puzzles can be readily created and saved to a data disk. After the program is given the size (limits are 15 x 15),the grid is displayed for letter insertion. One uses cursor controls for correction, with the return key supplying a black space for a blank. When finished, the computer then paces through the words, prompting you for clues.

Although the program is well done and has a nice Hi-Res presentation, entering a puzzle requires a finished puzzle to start with. The computer cannot help you design a puzzle from a list of given words. The program has excellent error checking and will prevent you from inputting words that don't fill the space properly, and, like all crosswords, won't inform you that the answer is incorrect. There is a print routine to either print or display on the screen your completed puzzle for checking or for use by cheaters.

THE CUBE SOLUTION

Company: Muse Software
Language: Machine Language
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**B –**	EASE OF USE	**B**	ERROR HANDLING	**B**
GAME CONCEPT	**B**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**C**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST?	**B**
GAME DEPTH	**N/A**	GRAPHICS	**C +**	VALUE FOR MONEY	**C +**

Solving a "Rubick's Cube" has become a pastime for millions of people. Although a few gifted children can solve the cube in under a minute, most puzzlers take anywhere from five minutes to never. You would be surprised at the number of people who, after having a child solve their cube for them, won't let anybody touch it again. And there are others who, out of frustration, left their cube in a sorry state of confusion. *The Cube Solution* is their answer. This program can painstakingly guide the user to solve "Rubick's Cube."

The program allows you to begin with either a mixed color cube, or to scramble one that's already been solved. Either way, it will step through the solution, pausing if you desire so that you can keep up, or simply dump a solution to the line printer. The display, which is adequately done in Lo-Res graphics, shows all six sides in two views set side by side. The top and front two sides are on the right. The computer, making quarter moves at a time, makes a move and posts what it has just done at the bottom of the screen. At various times it needs to turn the cube over, or around completely, and it so informs you. If you have a cube in your hand, the movements are easy to follow.

The program solves "Rubick's Cube" in a set manner, nor does it have any intuitive feel for shortcuts. This becomes obvious if you have experience in solving the cube, or even if you watch the demo where it makes two twists and proceeds to solve it. (Of course it wouldn't quite be a demo if it made two twists just to turn them back.)

The program has a good error handling routine to prevent you from entering a cube that could never be solved. It checks the pattern for each of the nine blocks on a side. Furthermore, it knows that each of the small cubes must have a different color on each side. And while not as fast as some people I've seen, the program works. If you need a little help from your computer to solve your cube, this may be an option. Another is too pull off the small blocks on your real cube (they snap firmly in place), and put them back correctly.

MISCELLANEOUS ENTERTAINMENT

ELECTRIC DUET

Company: Insoft
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 4
Disk or Tape: Disk

OVERALL RATING	C+	EASE OF USE	C	ERROR HANDLING	B–
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	B
CREATIVITY	N/A	CHALLENGE	N/A	VALUE FOR MONEY	B–
GAME DEPTH	N/A	GRAPHICS	C	HOLDS INTEREST?	C+

Electric Duet is a two voice music synthesizer that doesn't require additional hardware on your Apple. The term "two voices" means that the program can play two notes simultaneously, a difficult feat with a sound system that allows you to click a small speaker often enough to produce a tone. The author accomplished this through "duty cycle modulation" on a carrier tone of 14,080 Hz. This essentially allows each of the two tones to be on only a certain percentage of the time.

The most important thing to consider in a program like this is the quality of sound. While it is a definite improvement over single tone music programs such as the author's earlier *Musicomp*, it lacks the tonal quality of a music board or even what is available from a mediocre sound chip such as used on the Atari home computers. The sound wave is sawtoothy, and the carrier tone is quite audible during pauses when output through the cassette port to your stereo system. This high pitch carrier leads to listening fatigue.

You enter music by keyboard or by the easier piano entry mode. Notes are entered in pairs, one for each part. For example "4.,3G# 4.,2F" means play a G# note in the third octave as a dotted quarter note, and simultaneously play another F note in the second octave. While this works well for notes in both voices when they are of equal length, notes that are of unequal length require a different procedure that doesn't work well. Notes must be entered in terms of the shortest note at that point. If voice #1 had a quarter note and voice #2 required a half note, the second voice would be entered as two consecutive quarter notes. Unfortunately, this would be played with a quick break between notes.

The piano method of entry is much easier. A piano, with the corresponding keyboard notes, is displayed at the top of the screen. As you play, the notes are entered automatically. It does not enter the length of the note; that is done later with the editor. Since there is no repeat bar as in sheet music, all the notes must be entered one at a time. It would have been nice if there was a GOTO line number command for repeat segments.

Each of these note entries is by line number, just as in BASIC. An editor is provided where you can move up and down through the file with the I and M keys. But inserting and deleting lines requires a tedious procedure of "opening" the file, deleting/inserting a line, then closing the file. One of the most powerful features of the editor is the ability to either transpose the music into a different key, and to slow the music's tempo down or speed it up. Furthermore, all notes in the music composition can be changed by a factor of one and one half. Thus all quarter notes will be lengthened to dotted quarter notes and dotted quarter notes to half notes, etc.

All compositions are saved as binary files, and pieces can be inserted into another composition. You can also use these compositions in your own programs for free if credit is given to the proper program. A play module is transferred off the disk and incorporated with your program.

The documentation is clearly presented in a 17 page manual. There are various examples, and you can also look at the compositions that come on the disk. These range from the ever popular Entertainer to several obscure classical pieces.

Electric Duet is a fair program that coaxes the Apple into producing better sound, but it is no substitute for a good music synthesizer. While the sound is an improvement over *Musicomp*, it lacks *Musicomp*'s Hi-Res display of the scrolling sheet music. In this program you are stuck with the limitations of the hardware; and if you have a good ear you will shudder at the clarity and the high pitch carrier tone. But as an inexpensive learning tool it is good for budding musicians who would like to learn how to program some harmony into their music compositions.

THE VOICE

Company: Muse
Language: Assembly
Hardware Requirements: 48K Apple II/II +, disk drive, tape

Department: Entertainment
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk*

OVERALL RATING	**D+**	EASE OF USE	**C**	ERROR HANDLING	**B**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**B–**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST	**D**
GAME DEPTH	**N/A**	GRAPHICS	**N/A**	VALUE FOR MONEY	**D**

The Voice is amusing as well as useful if you're interested in voice simulation from your Apple. I found it to be somewhat cumbersome to enter new words into the vocabulary, but once loaded very easy to work with. For the programmer, *The Voice* could be very useful as a voice-synthesizer. However, one should not expect an accurate reproduction of speech. The speech quality is comprehensible but could be better. It allows you to speak from any BASIC program by using print commands. It can store 80 words on a data disk.

FORTE

Company: Softtape
Language: Machine
Hardware Requirements: 32K

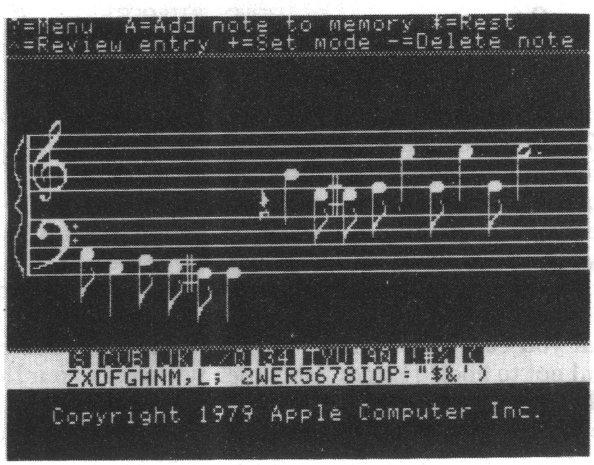
Department: Entertainment
Sugg. Retail: $19.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	**B**	CONTROLABILITY	**B–**	ERROR HANDLING	**B+**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**C+**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST	**B**
GAME DEPTH	**N/A**	GRAPHICS	**N/A**	VALUE FOR MONEY	**B**

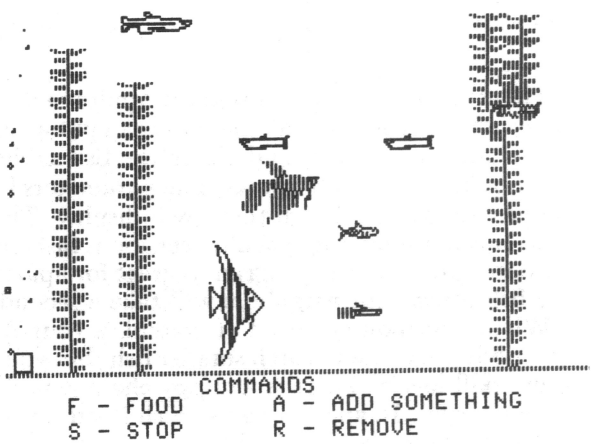
FORTE is a music program that has its own interpretive language devoted to the playing of music. It has writing, editing and debugging modes. Generated music can either be played through the Apple Speaker or directed to a Hi-Fi System via the cassette output port. Programs can be saved to either disk or tape. It features the unique capability of including the lyrics for display as the single-line melody is played.

The language itself is fairly easy to learn. There are seven octaves available with four different voices. Timing and tempo can be varied. One enters a series of notes in a line number. Like Basic, these line numbers are sequenced in ascending order. Several notes can be entered on any line number and one can reference a line number as a subroutine for repeated musical phrases. For example, a simple entry of a middle C quarter note is entered as C3/4.

The program is throughly documented. Like any language, the program has a series of error messages for invalid entries. It is definitely a well thought-out program, although it lacks graphics. FORTE is a good program overall for music buffs.



MUSICOMP



AQUARIUM

MUSICOMP

Company: Apple
Language: Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $45.00
Availability: 8
Disk or Tape: Disk*

OVERALL RATING	B+	CONTROLABILITY	B+	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	B
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	B+
GAME DEPTH	N/A	GRAPHICS	B+	VALUE FOR MONEY	B

MUSICOMP allows the user to compose tunes via electronic sheet music on the Apple Hi-Res screen. The keyboard, acting as a piano, covers a four-octave chromatic range. The sound, which can be varied over a three "voice" and four "timbre" tonal range, allows one to arrange as well as compose. The sound is more suggestive of an electronic synthesizer than the usual Apple sounds. The output, through the cassette output jack, can be sent to one's own stereo system.

The program's main appeal involves viewing your musical tunes or any of 24 preprogrammed classical pieces as they are paraded across your screen in the form of moving sheet music with each note drawn in step with the musical sound. The program is easy to use and is well documented. It doesn't require any additional hardware.

Each note, as it is chosen for input, is displayed on a music staff centered on the screen. One sees the musical symbol as the computer produces the corresponding sound. If the note is correct, the A key accepts the note in memory. One can later edit the composition and save the music to disk.

After using the program extensively to input dozens of songs from sheet music, I've found several drawbacks. With no speed control you sometimes have to literally translate the lengths of the notes throughout the song to maintain the correct speed. For some reason, they did not include a dotted 16th note. This creates some musical headaches. Some music just doesn't sound right when entered. Also, several mistakes in the editing routines caused problems in early copies of the program.

In spite of the drawbacks discussed above, this program is one of the better non-musicboard programs on the market and the only one to use graphics.

AQUARIUM

Company: Cross Educational Software
Language: Applesoft & Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $25.00
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C+	CONTROLABILITY	B	ERROR HANDLING	B+
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C+
CREATIVITY	B−	CHALLENGE	D+	HOLDS INTEREST	C
GAME DEPTH	C	GRAPHICS	B	VALUE FOR MONEY	C+

The strange uses people program Apples to do never ceases to amaze me. Programma offers a program to simulate life in a Hi-Res aquarium tank. One can put a variety of fish (Zebra, Angel, Siamese Fighting, Neon and Guppy) into the tank, some food, and watch the fish as they swim and feed. Baby guppies are quite vulnerable to larger fish and rarely grow to adulthood. The parameters for adjusting speed and survival are documented in the instructions, so one can custom design their own display. There are two versions: Applesoft and Machine. While the Applesoft version is too slow, the Machine version is fast enough to keep your attention watching the big fish chase and devour the baby guppies. The program is great for apartment dwellers who aren't allowed to keep pets. Since most TVs look like fish tanks your neighbors will take a second look.

When you soon get tired of watching your Apple Aquarium you can play some of the fishing games. One can lower bait on a line to catch smaller fish, but you must be careful not to hook a larger fish which will break your line. Many skill levels. There is a guppy chase game where the male tries to impregnate a female who would rather remain a virgin. In another game, Fish Food Race, two fish race to see who can stuff themselves. The program is cute and suitable for young children.

MICRO-PAINTER

Company: Data-Soft Inc.
Language: Integer or Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B+	EASE OF USE	A	ERROR HANDLING	A
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	N/A	HOLDS INTEREST	B
GAME DEPTH	N/A	GRAPHICS	A	VALUE FOR MONEY	B–

MICRO-PAINTER by Bob Bishop is a draw-and-color graphics package that uses the "coloring book approach" to create colorful illustrations on the Apple. Using a program called Micro Draw and a joystick, one can create simple white line outline drawings. Then using Micro-Painter, the artist can invert the picture (white lines on a black screen), and, by positioning the cursor on any section of the drawing to be colored, pick one of 21 colors, push the paddle button and have the program automatically fill in a color to the black line boundary. Unfortunately, the routine doesn't allow one to repaint a section if a wrong color is chosen. The color strip feature deletes all the colors from the screen, including (sometimes) portions of the original drawing.

A rather unique feature which can be used for highly detailed corrections of any Hi-Res picture is Micro Option. The space bar toggles a magnified view (23 dots wide) of the Hi-Res picture. The image is essentially a Low-Res view of the Hi-Res dots around the cursor's position. One can easily move this cursor by keyboard control and color individual dots with any of the six Apple Hi-Res colors.

The program comes in a box complete with crayons and magnifying glass and an instruction book which appears to be designed for a child's use. One of the intents of the program is to allow children to familiarize themselves with computer operations while they create beautiful pictures. The identical line drawings that are stored on the program disk are presented in the instruction book to allow the child or adult to color before attempting to do it with the program. The program is a novel idea which uses some very unique Hi-Res graphics techniques. It also has some serious uses.

BEST OF MUSE

Company: Muse
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk*

OVERALL RATING	C–	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C+	SKILL INVOLVED	C	DOCUMENTATION	C+
CREATIVITY	C	CHALLENGE	B	HOLDS INTEREST	C–
GAME DEPTH	C	GRAPHICS	C–	VALUE FOR MONEY	C

This package contains four entertainment programs. Two games, MAZE GAME and ESCAPE, are puzzles. In the first, the computer generates a maze of user-defined size. The viewpoint of the player is from inside the corridors as he navigates from one end to the maze exit. This three-dimensional effect is done in Lo-Res and is quite adequate. The lost player has the option of leaving retraceable footprints on the floor or being able to view a map which shows the corridors he has been in. Yes, we have been able to get out of the maze; at least, small mazes. However, ESCAPE, which is similar, has false maps, clues, and a policeman who patrols the halls. Our reviewers haven't found a way out, yet.

TANK WAR is the classic confrontation of two enemy tanks on an open battlefield. The tanks, which are always in motion, are steered by using paddle controls. Shooting is either single shell or machine gun. Machine gun firing not only stops your tank's motion, but causes your tank's gun temperature to rise. A lull in the action allows the enemy tank to repair quickly. Victory comes only if you can inflict enough damage quickly. Having played many tank games, this is not a good version. Tanks can go right through each other and they move too fast. Damage repair on enemy tanks occurs much too rapidly.

MUSIC BOX allows you to perform tunes on your Apple. The disk also features a slide show module to allow you to sequence through a group of Hi-Res screens automatically.

APPLETALKER

Company: Softape
Language: Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	N/A
CREATIVITY	B	CHALLENGE	N/A	HOLDS INTEREST	C
GAME DEPTH	N/A	GRAPHICS	N/A	VALUE FOR MONEY	C+

With *Appletalker*, you may, through the cassette input part of your Apple II computer, build tables of words that can then be played back through the Apple's own speaker. These words can be incorporated into your own programs for some interesting effects.

GAME PACK #1 THROUGH #4

Company: Beagle Bros. Micro Software
Language: Applesoft & Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $24.00 each
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C–	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	B
CREATIVITY	C	CHALLENGE	C	HOLDS INTEREST	D+
GAME DEPTH	C–	GRAPHICS	C–	VALUE FOR MONEY	D+

Each of these four game packs in general are professionally done text or Lo-Res games. The text games are either amusing party games or are very cleverly animated by shifting text about the screen. However, the Lo-Res games are technologically behind the times. At least one of these three games on a disk is a well done logic game puzzle for one or two people. Another is a game more suitable for children. Each of the game packs includes an 11 x 17 inch Apple Command Chart and an Apple Tip Book.

#1 Text Train, Sub Search, Pick-a-Pair

In one of the most creative text games this reviewer has seen, one commands a train pulling lettered box cars around the freight yard. With real-time track switching and coupling, one must form a text-train with the correctly ordered letters in a word and drive that train to the station. This contest is simply a race against the clock. Sub Search is a Lo-Res variation of the old battleship game where one must find the enemy ships before running out of fuel or oxygen; an average game at best. Pick-a-Pair is the game of concentration where one uncovers two different squares while looking for a symbol match. This is a good memory game for two children.

#2 Wowzo, Elevators, Quick Draw

Wowzo is a text maze game where two people compete to capture five letters that make up a word which is randomly scattered in a maze. On each turn one can change the position of a gate in the maze in addition to moving one of four directions. The strategy is to foil your opponent's next move by blocking him with a closed gate. Elevators is a race against the clock where you command four Lo-Res elevators that pick up passengers on upper floors and deposit them on lower floors. Suitable for children. Quick draw is a game for children where two gunmen shoot it out. The variation on this type of game is that the firing signal is determined by matching a symbol displayed on the screen. So-So.

#3 Magic Pack, Slippery Digits, Oink

Magic Pack is a clever four trick text package. A card trick is performed and the way the computer always wins is rather amusing. Slippery Digits is the Lo-Res version of the 15 number game where one moves the digits around until you get the 15 numbers in sequence. One can play the invisible version for an added challenge. Oink is a dice game where one gets the points if you don't roll doubles, in which case you lose all the points for that turn. You are given a choice when to to stop. The first to get 200 points wins. So-So. This is an average children's game.

#4 Buzzword, Triple Digits, Corn Game

Buzzword is a comical story creator. The story stops for an adjective and you choose a letter. The computer chooses a word from its vocabulary that starts with that letter. You can make your own stories. Triple Digits is a two player text logic puzzle where you attempt to place trios of numbers on unoccupied squares. Each player can block the other. Corn Game is a children's game where one guesses which animal will eat how much corn. If the choice is a correct one, you accumulate points.

5 MORE GREAT GAMES

Company: Avant-Garde Creations
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 3
Disk or Tape: Disk*

OVERALL RATING	D+	EASE OF USE	C	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	D+	DOCUMENTATION	C
CREATIVITY	D+	CHALLENGE	D+	HOLDS INTEREST	D
GAME DEPTH	C–	GRAPHICS	C–	VALUE FOR MONEY	C–

5 MORE GREAT GAMES continues the philosophy of explaining the relationships between good and bad. As in Avant-Garde's first game pack, this is a mixed group of games; some good, some bad.

Perhaps DEEP SEA TREASURE is the best and most fun of the five games. You're a diver who tries to retrieve a treasure from the bottom of the sea. The boat lowers the winch while you fight off killer sharks, octopuses and enemy submarines. The diver, who is animated, swims up and down. You're armed with a laser. You must protect yourself and the line. The game is key-board controlled. The best of the five games, it deserves an 80 rating.

DEPTH CHARGE is the usual submarine-versus-your-destroyer chase game. Since your ship doesn't move, all you can do is set depth charges at specified levels to kill subs. Dropped charges can also be used to block torpedos. The worst submarine game yet, it can be given no higher than a 40 rating.

The object of MYSTERY CODE is to find the characters that make up a word by moving around a game board filled with letters and numbers. Clues are given by sounds that indicate how far one is from one of five correct characters. There is a time limit. Since there is no penalty for guessing wrong, it is probably faster to systematically move around the board and try to guess what the character is at each position unless you think you know what the word itself is. This game can only be given a 45 rating based on its one-dimensional challenge.

TURN EM LOOSE is a game where in you sneak around a zoo and release caged animals. Watch out for the patrolling guard who tries to shoot you. Its simplistic approach deserves only a 50 rating.

THE MINE FIELDS OF NORMALCY is a game wherein one arranges symbols in a certain order on the game board. Initially, the symbols are arranged at random. One picks them up, moves elsewhere by paddle, then puts them down. There are mines on the field and an occasional 'tornado' that rearranges parts of the board. Because the game is slow (Applesoft), the computer sometimes doesn't respond to your paddle inputs. One can therefore overshoot his destination, possibly into a mine. Because of its lack of response, this game can only be given a 50 rating.

BEST OF BISHOP

Company: Softape
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	C–	EASE OF USE	D+	ERROR HANDLING	N/A
GAME CONCEPT	C–	SKILL INVOLVED	C–	DOCUMENTATION	C
CREATIVITY	D	CHALLENGE	C–	HOLDS INTEREST	D+
GAME DEPTH	C	GRAPHICS	C+	VALUE FOR MONEY	D+

Bob Bishop wrote some of the first Hi-Res programs available for the Apple II in 1978 when the technique was still a mystery and the Hi-Res routines weren't available. Several of his programs became classics. This disk contains nine of his early programs, five of them being games.

His games include ROCKET PILOT, SAUCER, INVASION, STAR WARS, SPACE MAZE, and BOMBER. The object of ROCKET PILOT is to guide your ship over the mountains before your fuel runs out. Using paddles for thrust and direction, it requires good hand-eye coordination. In BOMBER, one bombs a moving tank. The game lacks scorekeeping and requires little skill. SPACE MAZE requires a joystick to maneuver a rocket through a maze without hitting the walls. The remaining two are simplistic but classic shoot-'em-up space games.

TALKING CALCULATOR may be of interest for young children just learning math. This graphic calculator does addition and subtraction. It audibly repeats number inputs from the keyboard, then says the correct answer.

MUSIC KALEIDOSCOPE is a Lo-Res graphics demo that takes the musical output from a cassette recorder and produces a display in step with the music. APPLE VISION has a little man do an animated dance to a tune for introducing the Apple Computer. There is also APPLE MOVIE, which produces a slide show of several Lo-Res screens.

ABUSE

Company: Don't Ask Software
Language: Machine
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 2
Disk or Tape: Disk*

OVERALL RATING	N/A	CONTROLABILITY	B	ERROR HANDLING	B
GAME CONCEPT	C	SKILL INVOLVED	N/A	DOCUMENTATION	C
CREATIVITY	B	CHALLENGE	N/A	VALUE FOR MONEY	N/A
GAME DEPTH	N/A	GRAPHICS	N/A	HOLDS INTEREST?	N/A

Abuse essentially offers a program that allows the user to trade insults with the computer. It has its roots in the program *Eliza*, where the computer responds to your input as if it were a psychiatrist. The computer acts on key words in any input sequence, and attempts to top your last insult. It even tends to be obnoxious, beeping at you if you ignore it. While most of its insults appear to be random, occasionally it produces a clever put down.

I'm not sure how to rate a program like *Abuse*. Certainly one man's pleasure is another man's poison. I've talked to some people who enjoy the program and others who hate it. Those who hate it become bored with it after five minutes, while those who like it will trade insults with the computer for hours. It certainly will relieve frustrations if you've had an altercation with your micro.

THE PREDICTOR

Company: Pickam Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $79.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	B	DOCUMENTATION	C	RELIABILITY	A
EASE OF USE	B	VALUE FOR MONEY	B	ERROR HANDLING	B–
VENDOR SUPPORT	B	VISUAL APPEAL	B		

For all football fans who enjoy placing a little wager on that big weekend game, your program has arrived. *The Predictor* claims to be more that 60% accurate in predicting who will win each week, keeping within a seven point spread. This has been true, according to the author, for the years 1977-1981. He also stipulates that the program's highest accuracy is obtained between the 8th and 14th weeks of the season. The program contains the schedule information for the current season. All that you have to do is enter the following information for each team, after all games within a given week have been played: points scored, rushing attempts, rushing yards, net passing yards, gross passing yards, pass attempts, pass completions, pass interceptions, fumbles, fumbles lost, and penalty yards.

I know this is a lot of information to be added, but all of this information is contained in the newspaper. (I verified this by looking in the *Los Angeles Times* Sports section.) The author also explains how to derive information that may not be included in the average game statistic listing. When entering data, the program does some validity checking and will warn you concerning data that does not appear to be correct. You must enter all data for each team and include all games played during a given week *at the same time*, so remember to wait until after Monday night football!

Initial predictions are not made until after the information for the first four weeks of the season has been entered. There are function commands provided to modify the schedule, to change a given week's stats in case you make a mistake entering data, and give you the ability to "clean" the entire system in preparation for the next year (although on this item Pickam Software offers an update service for the program and data on a yearly basis). One of the nice features of this package is that it contains a complete demo version of the program, so you can go through the actual operation of all features without modifying or affecting your real data.
inclusion of the demo program, the scant documentation is more than adequate. It is interesting to note that there is added information in the documentation on what to do if a player's strike occurs — indicating that this program is very current.

Unfortunately, I am unable to comment on the accuracy of its prediction, as this review is being written during the last week of pre-season. But I intend to continue testing the program out of curiosity, and will try to supply an update note on how well *The Predictor* performed.

PRO FOOTBALL & COLLEGE FOOTBALL

Company: System Design Lab
Language: Applesoft
Hardware Requirements: 16K

Department: Entertainment
Sugg. Retail: $26.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	B	CONTROLABILITY	B	ERROR HANDLING	A
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	A
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	A
GAME DEPTH	N/A	GRAPHICS	N/A	VALUE FOR MONEY	B

These are not games in the normal sense, but prediction programs for professional football and college football games that touts some rather fantastic results. A data file from the previous season is also included. The program will predict the winner of chosen games and indicate the winning point spread.

To get down to cases, some rather flamboyant and extravagant claims adorn the PRO FOOTBALL package. To wit: "1978: BOOKIES ENRAGED! 1979: L.A. TV COVERAGE! 1980: WON 73% AGAINST VEGAS!" This smacks of promotion that might fall under the scrutinizing eye of David Horowitz if it ever attains that distribution level among computer-oriented consumers.

The track record of the PRO FOOTBALL predictor software package for the total number of correctly-predicted games in beating its own generated spread in 1979 and 1980 is as follows: in 1979, 97 games beat or tied the spread for a 43.4 percentage; in 1980, 100 games beat or tied the spread, resulting in a 47.2 winning percentage. Up to the time of this review, the fifth week of the season shows these results: 27 of 80 games have come out on top for a 38.6 winning percentage, using the new Applesoft version vs. the previous Integer Basic edition (which, by the way, was run devoutly every week for the preceding two years. The only apparent difference between the two versions is that the Applesoft package breaks down the point-spread into tenths of a point).

One of PRO FOOTBALL's jacket blurbs concerning that 1980 73% winning prediction claim is further explained in the documentation. However, in doing so, more questions are raised than answered. In essence, the claim is made based on "certain games" which the program predicts more accurately than others and which fall into the "upset" category as applied against the Las Vegas Line. What "certain games"? How does this pragmatically apply to the user of this system? Who would be so dauntless as to make wagers based upon empirical won-loss, home-field-only factors? Although these questions are addressed in the documentation, they are not satisfactorily answered therein. This reviewer is not a gambling type; if he were, based upon this system, the only "ENRAGED" bookies and "TV COVERAGE" he would have to contend with would result from his exposure as a betting buffoon. In all fairness, however, this contributor does admit to being somewhat fanatically addicted to the predictive vagaries of this package, else why would he keep a weekly record for two-and-a-half years on its results? Worse yet, why would he be running both the older Integer Basic PRO FOOTBALL programs and the recent Applesoft version in parallel for comparative results (which results, by the way, have been identical up to this writing)?

In summary, this system (like all other systems involving gambling) should be used advisedly as a recreational pastime, lest you say goodbye to your shirt. And please, SDL, could you tone down your instructional text on both the cover and pages 10 and 11 of the documentation a degree or two?

WIN AT THE RACES

Company: System Design Lab
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $39.95
Availability: 6
Disk or Tape: Disk

OVERALL RATING	B+	CONTROLABILITY	N/A	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	B
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	B
GAME DEPTH	N/A	GRAPHICS	N/A	VALUE FOR MONEY	B

WIN AT THE RACES is not a game, but a serious attempt to use the Apple's computing power to analyze factors that users believe are important in determining the outcome of a horse race. The program is based on the well-known book by Dr. William Quinn titled, "Winning at the Races." We can't vouch for its actual track record, but it looks like it might be worth a try by the serious handicapper.

The program is completely menu-driven and has excellent error trapping. Forty-six major tracks are included with the program, as well as a provision for four tracks of your own choosing. The documentation accompanying the program is clear and inclusive. The typical eight horse race takes only about 15 minutes to completely handicap.

HERE'S HOLLYWOOD

Company: Versa Computing
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	A	ERROR HANDLING	B
GAME CONCEPT	C–	SKILL INVOLVED	N/A	DOCUMENTATION	C
CREATIVITY	C–	CHALLENGE	N/A	HOLDS INTEREST?	D
GAME DEPTH	D	GRAPHICS	A	VALUE FOR MONEY	C

Here's Hollywood is a two disk game that contains portraits of 24 Academy Award winning stars by computer artist Charlotte Miller. John Wayne, Alan Alda, Ingrid Bergmann, and Charlie Chaplin are several of the personalities included. The object is to match the portrait with the name; and these portraits can either be viewed as a slide show, or in the "Picture Game" where clues are offered to help identify them.

There is also a "Match Game" that asks the player to identify in which of five movies an actor or actress has starred, and a "Quotes Game," that asks players to identify quotes from well-known movies. Clues from both games can be varied.

Movie buffs may initially be impressed with the graphics, but it's a sure bet they will tire of this game rather quickly.

HERE'S HOLLYWOOD

APPLE-LIS'NER

Company: Softape
Language: Integer
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $29.95
Availability: 8
Disk or Tape: Disk

OVERALL RATING	C	CONTROLABILITY	C	ERROR HANDLING	N/A
GAME CONCEPT	C	SKILL INVOLVED	C	DOCUMENTATION	C
CREATIVITY	B–	CHALLENGE	C	HOLDS INTEREST?	C
GAME DEPTH	C	GRAPHICS	C	VALUE FOR MONEY	C–

APPLE LIS'NER is a software package designed to allow you to build a table and input up to 31 words through the cassette input port. Each "word" can be up to 5 seconds long. These "words" can then be appended to your own program. The Apple can then "recognize" these words when you speak into your recorder microphone.

PERSONAL ENLIGHTENMENT

ASTROSCOPE

Company: AGS Software
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	**B**	EASE OF USE	**B+**	ERROR HANDLING	**C**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**B**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST	**N/A**
GAME DEPTH	**N/A**	GRAPHICS	**B–**	VALUE FOR MONEY	**B**

Astrology programs define the mathematical relationships and patterns of planetary bodies in our solar system at the time of one's birth. Its premise is that there is a connection between planetary locations at birth and the way in which an individual's life unfolds. As to why there is such a connection is unknown, but several astrologers have proven statistically through the study of charts of successful doctors, scientists, artists, sports figures, soldiers, business executives and politicians, that the locations of Jupiter, Mars, Saturn and the moon were not randomly positioned at birth. While this does not prove that astrology works, it is something more serious than the "stuff" you see in daily newspaper columns.

Being essentially mathematical in nature, astrology lends itself ideally to the computer. The computer's accuracy, combined with Steve Blake and Robert Hand, two of the best authors of astrology books, have produced the best introduction to astrology that this reviewer has seen to date.

ASTROSCOPE will calculate a horoscope given a person's exact time and place of birth for the years 1880 to 2000. It is accurate to 1/10th of a degree. It calculates the house positions and aspects, then tells you what they all mean in 1500 or more words.

The documentation is excellent and includes charts of latitutes and longitudes for major cities. There is also a list of birth information for famous people whose charts you can try.

The interpretation is "cookbook" in style. By that, I mean that each explanation is treated separately as opposed to being synthesized as a professional astrologer would do. Therefore, in order to see the forest through the trees, reserve judgment until you've read all the material.

ASTRO APPLE

Company: Quality Software
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $19.95
Availability: 5
Disk or Tape: Disk

OVERALL RATING	**C**	EASE OF USE	**B–**	ERROR HANDLING	**B**
GAME CONCEPT	**N/A**	SKILL INVOLVED	**N/A**	DOCUMENTATION	**C**
CREATIVITY	**N/A**	CHALLENGE	**N/A**	HOLDS INTEREST	**N/A**
GAME DEPTH	**N/A**	GRAPHICS	**C+**	VALUE FOR MONEY	**B**

Astro Apple is an elementary astrology system. The program calculates a natal horoscope showing the location of the sun, moon, and planets at the time of one's birth. The calculation can be considered accurate enough for the amateur astrologer, but not for a professional. The program provides a general interpretation of the subject's horoscope. It also will do a generalized party-type interpretation for a particular month and compare the compatability of two person's horoscopes.

The program is entertaining, but should not be taken too seriously with regard to potential future decisions, unless they are party-type ones.

ASTROSCOPE [Printing Version]

Company: AGS Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $200.00
Availability: 1
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	N/A
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	N/A
GAME DEPTH	N/A	GRAPHICS	C	VALUE FOR MONEY	C

This version of ASTROSCOPE requires a licensing agreement for marketing the output commercially. It is primarily used by professional and semi-professional astrologers to cast accurate horoscopes (accurate to 1/10 degree). It calcuates the house and planetary positions plus their aspects, prints the person's chart in one of four house systems, then tells what it all means in a 1500 word report.

The program comes on two disks, one containing the program, and the other text files for the report. Unfortunately, since the program and text files won't fit on one disk, AGS requires two disk drives. We feel that this is unfair to the end user since the program's interaction with the text file is minimal. The only time it uses the second drive is during the 1500 word report stage. Having only one disk drive, I changed line #31730 back to Drive #1. It worked perfectly if I swapped disks just after the calculations. AGS should put in an option for a single drive with a simple pause statement for the user to swap disks at the appropriate time.

Our version was configured to run on an IDS 560 printer (Paper Tiger). Output takes approximately 12 minutes. It also runs on other printers in the 132 column mode with little or no change. A slower printer like the Epson will take 17-18 minutes for a complete printout.

The program is well documented with simple user instructions. It also has an editing routine to correct inputs for the average astrologer who knows nothing about computers.

SUPERPROGRAM

Company: AGS Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $200.00
Availability: 1
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B–	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	B–
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	N/A
GAME DEPTH	N/A	GRAPHICS	C	VALUE FOR MONEY	C

SUPERPROGRAM contains four separate astrology modules, (AGS 1, 5, 9, and 10) that are sold for $30 less than if the programs were bought individually. The package includes a NATAL HOROSCOPE, PROGRESSED HOROSCOPE, SOLAR RETURNS, and LUNAR RETURNS.

These programs are designed especially for the professional astrologer. They are very technical in nature. The NATAL HOROSCOPE will cast a person's chart at the time of their birth. If one has a printer, the chart will be plotted; otherwise, one will have to copy the data from the screen. Accuracy is generally within one minute of arc for the planets and two seconds of arc for the sun and moon. Charts can be formed for any of seven house systems.

The program generates a text file of the person's natal horoscope so that the other programs can use the data in their calculations. Given any current date, one can calculate a progressed chart or even do a solar or lunar return. They include a chart transfer program free for those who buy the complete package. Again, the documentation explains all input routines in great detail on the premise that astrologers are computer novices.

SEX-O-SCOPE

Company: AGS
Language: Applesoft
Hardware Requirements: 32K

Department: Entertainment
Sugg. Retail: $30.00
Availability: 4
Disk or Tape: Disk

OVERALL RATING	B–	EASE OF USE	B+	ERROR HANDLING	C
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	B
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	N/A
GAME DEPTH	N/A	GRAPHICS	B–	VALUE FOR MONEY	B–

SEX-O-SCOPE will cast an accurate horoscope for any person, after which, assuming one's life and particularly one's sexual life is influenced by the stars, interpret it. The program will display (screen only) a 1500 word essay that is bound to make you blush. The text is written by John Townley, author of "Planets in Love." The program is meant to be lots of fun and fodder for parties.

HANDWRITING ANALYSIS PROGRAM

Company: Micro-Lipps
Language: Applesoft
Hardware Requirements: 48K, ROM Applesoft, Disk Drive

Department: Entertainment
Sugg. Retail: $19.95
Availability: 2
Disk or Tape: Disk

OVERALL RATING	C	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	C
CREATIVITY	N/A	CHALLENGE	N/A	HOLDS INTEREST	C
GAME DEPTH	N/A	GRAPHICS	C	VALUE FOR MONEY	B

This is a rather interesting and surprisingly accurate handwriting analysis program. In six test cases performed on friends by this reviewer, the dominant majority of the personality profiling statements were qualitatively correct. The output is stated positively and in non-patronizing terminology.

It is intended as an ice breaker for parties and for general amusement, and in this regard it succeeds quite well; it is the *first* program that one Apple wife of 18 months standing has become sufficiently interested in to want to learn how to boot the system so that she can run it for her friends!

The program is quick and simple to use. Get a brief handwriting sample, answer 22 multiple choice questions on it, and receive a 500 word analysis, either on your screen or on your printer. (The bothersome double-spacing can be fixed by deleting the statement "IF SL THEN PRINT" in lines 35003 and 35012). The use of Hi-Res graphics to show various handwriting characteristics is well done, and the simplistically written instructions are quite adequate although somewhat lacking in graphological background or analysis techniques.

INTERLUDE

Company: Syntonic Software
Language: Applesoft
Hardware Requirements: 48K

Department: Entertainment
Sugg. Retail: $24.95
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	B	ERROR HANDLING	B
GAME CONCEPT	N/A	SKILL INVOLVED	N/A	DOCUMENTATION	A+
CREATIVITY	A	CHALLENGE	N/A	HOLDS INTEREST	N/A
GAME DEPTH	N/A	GRAPHICS	C	VALUE FOR MONEY	B

If the cover of the booklet that accompanies this program doesn't tip you off, the program itself certainly will. This is definitely X-rated material.

Interlude starts out by having the participants answer questions based on their sexual preferences. Using this information, the program suggests one of some 99 "Interludes" included in the program. Each interlude sets up a different romantic or sexual situation for the participants to enjoy.

Certainly a unique use for the Apple computer.

APPLE HARDWARE

GAME I/O PORT PERIPHERALS

Paddle and joystick peripherals have mushroomed during the last year. The combination of Apple Computer Company's decision not to supply paddles with the system as of February 1, 1981, and the debut of numerous arcade games which require joysticks has created an unprecedented demand for these products. Also, the need to quickly change from paddles to joystick, requiring access to a hard-to-reach paddle I/O port within the computer case, led a number of manufacturers to offer paddle port extenders or expansion ports. The following are some of the current game-oriented hardware additions and enhancements on the market.

PADDLES

HAND CONTROLLERS — THE KEYBOARD CO. — $29.95. These paddles, constructed of light-weight plastic and quality components, are extremely comfortable to hold. The manufacturer has incorporated a tapered handle which fits precisely into the palm of your hand. The paddle knob is large, yet easy to hold and turn with your opposite hand. Tests performed on the potentiometer show it to be very accurate and smooth over its entire range. The button, consisting of a large contoured contact switch, makes a distinct clicking sound when pushed, although it does take a hair longer to activate than other paddles of its type. If you own only one set of paddles, your reflexes will instinctively compensate for this lag. The paddle cable is strain-relief and is 60 inches long. The paddle is beige in color, obviously intended for complementing your Apple. Overall, the paddles are an excellent value and should last a long time.

TG GAME CONTROLLERS — TG PRODUCTS — $39.95. These paddles are constructed of light-weight, beige-colored plastic and are comfortable to hold. They employ a large paddle knob and large, sturdy, reliable buttons on the side. The buttons use contact switches, are extremely quick acting, and never miss. The potentiometers on these paddles sometimes tend to become noisy or jittery after long use. This problem can usually be corrected by flushing them with tuner cleaner. The manufacturer recommends rotating them back and forth for several minutes, but this rarely cures the problem. The cables are 60 inches long, and are not strain-relief. It is possible to break the thin wiring at the point where it enters the case. Overall, this reviewer would recommend the paddles, since I've used them for several months and find them to be very suitable for games that require lots of shooting, or for some of the newer pinball games that use two paddle buttons together, one for each hand.

ADAM AND EVE — TECH DESIGNS — $39.95. The trapezoidal-shaped case makes these paddles very comfortable to hold with either hand. They are beige in color, as is typical, to match the Apple computer. (I wonder if someone's wife perhaps had a hand in labeling paddle #0 "Eve" and paddle #1 "Adam.") The knob is one inch in diameter, and turns softly but smoothly. A trimmer adjustment is included for fine tuning. The three-eighths inch square push button on the side give both tactile and audible feedback. The five-foot cables are strain-relieved, even at the DIP connector. In short, a quality product.

PRO PADDLES — RAINBOW COMPUTING — $49.95. These beige-colored paddles appear to be very small compared to other types. They are only 2 inches long, 1 inch wide and 1 inch high. They are enclosed in a metal case and use the highest quality components. Their switches consist of a micro type, are rated at one million cycles, and use a very rugged and smooth acting potentiometer. The major complaint is that these paddles feel too small in your hands. Even a 12-year old found the device too small. The edges of the case are not contoured and tend to dig into your hand after awhile. Although the going isn't too bad when playing with one paddle, pinball games which require one paddle button in each hand for activating the flippers will eventually cause your hand to tire after a short time. This is because the paddle doesn't offer any surface area other than the large knob to rest your palm. I have no doubt that the paddles are reliable and responsive, but you should try them before purchasing. They are more expensive than their competition.

HAND CONTROLLERS — APPLE COMPUTER — $29.95. These are the same black paddles that Apple Computer once included free-of-charge with their computers. They are light-weight and not very rugged. They include small, unreliable push buttons in their design that wear out quickly and therefore need to be replaced often. I used to buy packages of Radio Shack contact switches for rewiring them regularly. The potentiometers also tend to get noisy after a while, and either need cleaning, or eventual replacement. I would hesitate in recommending them in light of the competition.

AZD PADDLES (2002) — AZD CO. — $34.95. These paddle controls are the largest of the group under review, and they are awkward to hold. They come in a rectangular box shape 3" by 3.5" by 2" thick. The paddle knob is too small, and requires more turning than seems necessary. The large, square firing button is located in the middle of one end. This has a good tactile feel when pressed, and should last several million cycles. The paddle cable is a good eight feet long; but it is not strain-relieved. Most people will find the paddles uncomfortable to use.

MIMCO STICK — MIMCO — $59.95. This is a very high quality, self-centering joystick with external trim adjustments on the top of the case. My initial impression was that it seemed to be too large; but it feels solid in your hand. The gimbal arrangement is the ball type. It is linear over its entire range on both axes, and displays virtually no over-travel. The trim adjustment allows flexible enough centering to match any game's requirements. There are three large, hairtrigger buttons on the top left side of the unit that respond with tactile feedback. The upper two can be fired with the rocking motion of a single thumb, for less fatiguing play. The bottom button (#2) is rarely ever used, because the standard has become two-button control. If you are used to other joysticks, button #0 is at the top and button #1 is in the middle. There is also a rocker switch to select between the joystick and an external socket. An extra set of paddles can be attached directly, without requiring an expansion port. The unit is connected by a 48" ribbon-type cable. This unit is topnotch, my personal favorite among joysticks.

KRAFT JOYSTICK KJS-O1A — KRAFT SYSTEMS — $64.95. This is a very stylish, beige-colored, spring-centered, gimbaled joystick. It is made by the people who build controllers for radio-guided aircraft. It has one advantage over its competitors: the spring-centering can be "defeated" by moving two switches on the bottom of the case to the free position. The spring return levers can be raised when the stick is pulled to one corner, while simultaneously setting the switch. Either one or both axes can be set to nonspring-centering. There is also a trim adjustment on the top of the case to match the centering to any game specifications. The two square buttons are set apart, one on the top and the other on the back side. This arrangement places the buttons beneath the thumb and index finger of the left hand for easy play. The unit's high quality components are connected to the Apple by a 60" shielded cable.

TG JOYSTICK — TG PRODUCTS — $59.95. This joystick is self-centering on both axes and is totally linear in its resistive circuitry. It is perfect for most types of space arcade games that require steering and have a neutral center position capability which you might prefer to return to automatically. This self-centering feature may be disabled by detaching the two springs inside the case. The unit also has trim adjustments for each axis located on the top of the case next to the stick. This allows the center and range of joystick control to be adjusted for the particular game or program. The joystick includes two large reliable paddle push buttons located to the left of the control stick. The entire unit is housed in an attractive light-weight, beige- hardened plastic case, and is comfortable to hold. A long 60-inch ribbon cable connects it to the Apple. It is undoubtedly the best joystick on the market.

JOYSTICK II — THE KEYBOARD CO. — $49.95. This non-spring-centered joystick is an extremely linear joystick in both axes. It is perfect for positioning the cursor in a graphics program or for games like "Missile Command", which are easier to play if the gunsight can be positioned accurately. The joystick has two buttons. One is a normal contact switch, while the other is a three-position toggle switch. This switch utilizes a permanent-on position and a momentary-on position which springs back to off in the manner of a push button. This arrangement, in games that require two buttons, is awkward. The buttons are diagonally-situated to each other and require the player to simultaneously press one button while pushing the other button sideways, all with one thumb. There are no trim adjustments available, although this is probably not needed with joysticks that aren't self-centering. The beige plastic case is nicely styled and is comfortable to hold. The joystick is connected to the Apple by a 54-inch long strain-relief cable. Overall, the joystick is a very good buy for a non-self centering variety.

CJM MICROSTICK — CJM INDUSTRIES — $59.95. This is an excellent nonspring-centered joystick. The stick is long, has a large black ball grip, and offers very slick movement. Its lack of resistance, coupled with the long throw, make it easy to position; yet this ease causes game players to hold the unit very tensely. The unit was barely able to reach the 0,0 position with any clearance. The pair of half-inch square firing buttons, located to the left of the stick, are the short-throw type and provide no tactile feedback. The unit is beige-colored, and is attached to the Apple with a 48" heavy duty, strain-relieved cable. The end connector is a Jones plug for use with their Apple-Xpander. But the vendor includes an adapter that has a standard DIP connector on its other end. In sum, it is a quality joystick.

AZD JOYSTICK (2001) — AZD COMPANY — $44.95. This joystick, featuring an open gimbal design, is the only joystick suitable for left-handed players. The two square buttons are on the front side (the side away from you) rather than on the top. They are large buttons, providing good tactile feedback. I found them spaced too far apart, and awkward to hold if using two fingers on the same hand. Many will prefer one finger from each hand. The joystick has trim adjustments located at the top. The unit is connected to the Apple by a three-foot shielded cable.

JOYSTICK — GESU ENT — $49.95. This is an attractive, lightweight, spring-loaded joystick. The mechanism consists of a double-axis gimbal arrangement. It is impressive to watch the gimbal mounts swivel. The joystick has two trim adjustments, although it must be opened for adjusting. Three small TI calculator-type push buttons are located below the joystick control. These buttons are difficult to press, and consequently become tiring when playing for long periods of time. The entire unit fits comfortably in your hand. It is brown in color and is connected to the Apple by a 48 inch-long ribbon cable.

JOYSTICK — DATAMOST — $59.95. This metal-cased joystick nicely matches the Apple's color. It is a non-spring-loaded joystick with two small push buttons. The entire unit feels heavy and solid; however, the plastic handle pulls loose too easily when children are playing. The oblong case is plain yet functional, and is connected by a short 45 inch-long ribbon cable.

ROBO STICK – ASTAR INTERNATIONAL CO. – $39.95. This model consists of a regular joystick with two buttons on the side. The unit is very light with flimsy buttons. The joystick was unable to reach the O,O position. The black plastic case appeared to be cheaply made, with two yellow plastic plugs that sealed off obvious button holes from a previous design. I would not recommend this product.

PADDLE PORT EXPANDERS AND EXTENDERS

SELECT-A-PORT – TG PRODUCTS – $59.95. This unit provides a convenient solution to expanding the paddle I/O port while at the same time providing easy access to that socket without opening the Apple's case. Its five diode-isolated sockets are switch selectable. One can either connect paddles or joysticks simultaneously while accessing whichever one is needed by a switch, or connect two paddle devices (4 paddles or 2 joysticks) so that they can be used in tandem as is done in dual joystick games. The fifth socket is not isolated and acts in parallel with the game socket. This is used for especially sensitive devices. The unit has an attractive flat case which matches the Apple, and it can be attached to the computer's side. We discovered that the unit is indeed diode-isolated, and should cause no device-to-device interference.

EXPANDAPORT – DATAMOST – $69.95. This device consists of an expansion interface unit which will allow the connection of a number of paddle port devices in a convenient manner. Game paddles, two joysticks, a light pen and/or a printer interface can all be connected either separately or simultaneously. Included is a three-way switch that determines which connectors are active. The device also has an internal speaker which connects to the Apple's speaker plug, thus replacing the computers internal two-inch speaker. The unit is housed in an attractive beige-colored case, and sits conveniently beside the computer for easy access. The price unfortunately is a little steep.

PADDLE-ADAPPLE – SOUTHERN CALIFORNIA RESEARCH GROUP – $29.95. This is a gameport extender with two switch-selectable ports. Either port can be selectively switched, or the unit can be rewired via supplied wire jumpers to support four paddles or two joysticks for multi-player games. One can also reconfigure a joystick to reverse the axis, if desired. The fourth paddle button is accessed from the cassette output port. Although the sockets are switch-selectable, they are not diode-isolated. Pressing a paddle button from the non-selected device interferes with the button on the selected device. The unit is designed as a small circuit board which will attach by tape to the Apple's side. This product is not as versatile as some others, but then, again, it is only half the price.

GAME SOCKET EXTENDER – HAPP ELECTRONICS – $14.95. This device simplifies changing paddles or joysticks by extending the paddle connector outside the computer with a two-foot cable. The socket uses a force lever or "zero insertion force" device to connect the paddles or joysticks. This makes it extremely easy to disconnect devices. The unit attaches to the side of the computer.

PARADISE PORTS – TECH DESIGNS, INC. – $39.95. This is a very compact printed circuit board with sockets built into the PC board itself. It allows you to connect any combination of three joysticks (or paddles); and it allows a pair of joysticks to be connected simultaneously, one using PDL 0 & 1, the other PDL 2 & 3. Socket A is always connected to PDL 0 & 1, and Socket C is always connected to PDL 2 & 3. Socket B is switch-selectable. Socket D is wired in parallel with the paddle port. The blue colored unit is connected to the Apple by an 18" ribbon cable.

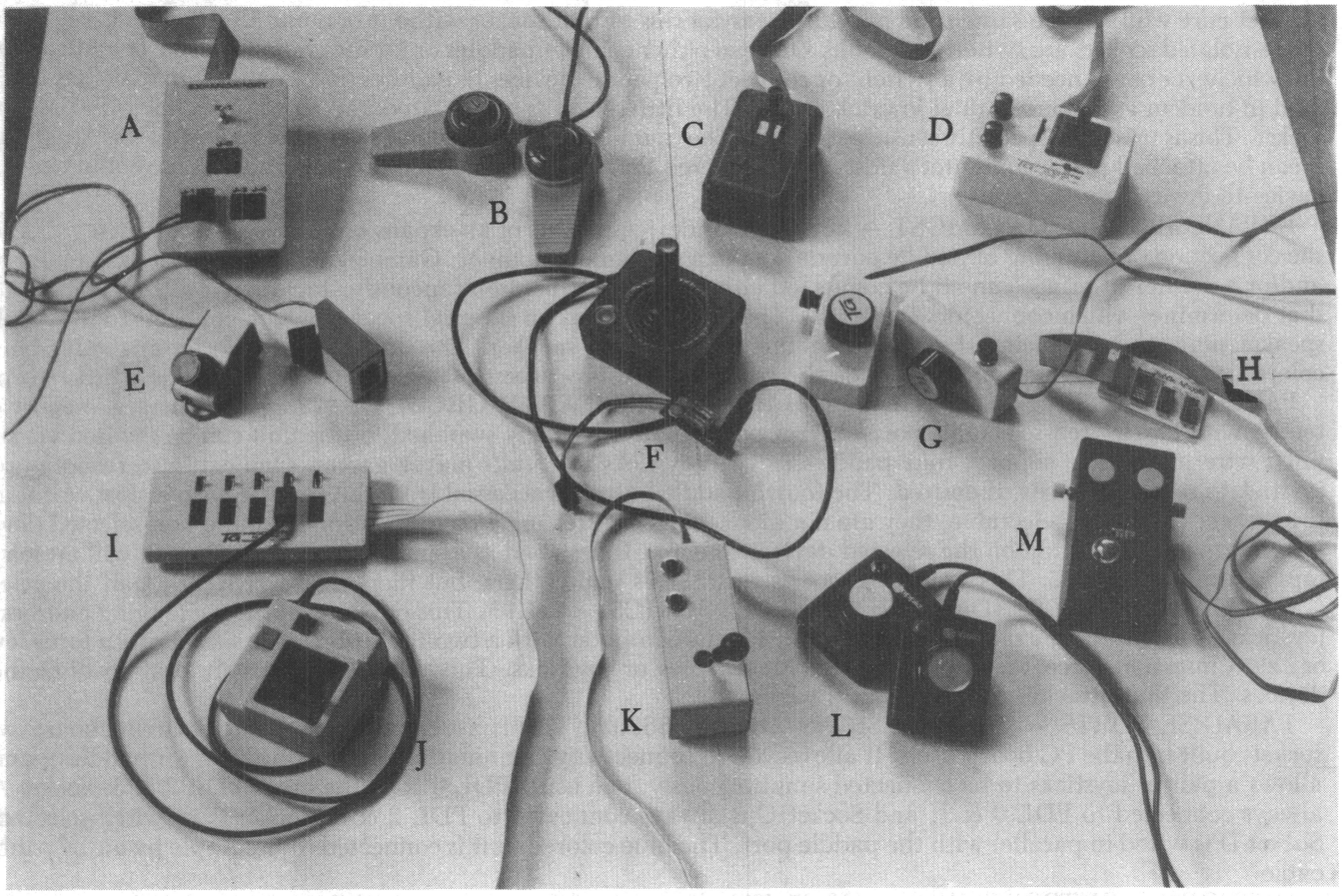
OUTPORT – OUTPORT, INC. – $19.95. This device simplifies changing paddle port peripherals by extending the paddle connector outside the computer. It uses a "zero insertion" force lever to connect the paddles or joystick. It has a 20" ribbon-type cable that allows you to attach it on the side of your Apple near the front.

TWIN PORT – OUTPORT, INC. – $19.95. This game-port extender is switch-selectable between two ports. Either port can be switched on to allow the operation of either a pair of paddles, or a joystick, without disconnecting. Two joysticks cannot be attached simultaneously. It extends outside the Apple, connected by a 20" ribbon-type cable.

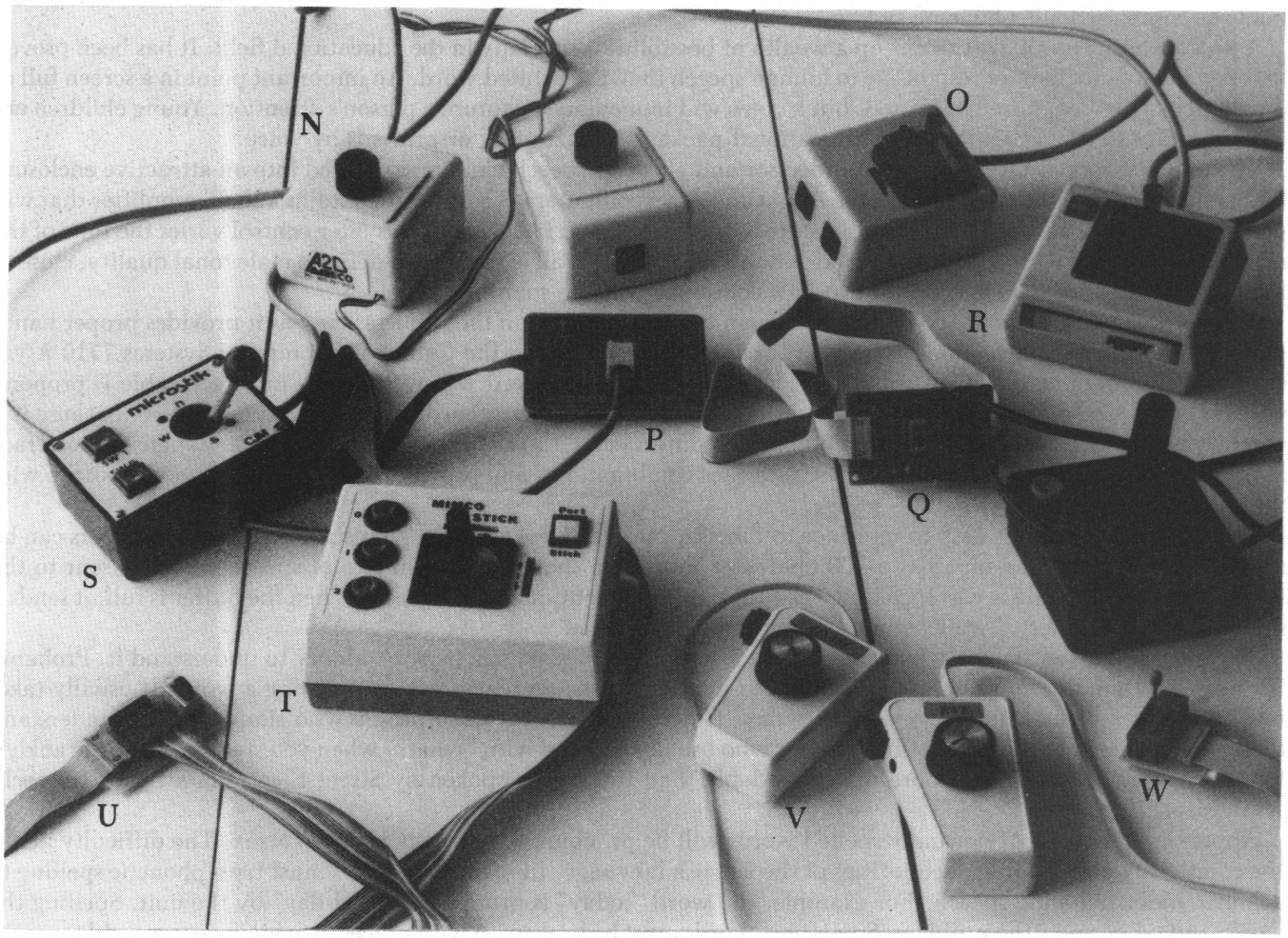
THE PORT AUTHORITY – OUTPUT, INC. – $34.95. This device adapts two Atari-type joysticks for use on the Apple II Computer. There is a great speed advantage in using this method, since the Apple II takes up to 2,840 microseconds to read each paddle. Because the Atari stick is merely an assembly of four on-off switches and a button for firing, it can be read by an Apple using the button inputs on the paddle connector. Ten inputs are required with two joysticks, which means that the multiplex readings must be accessed through the two annunciator lines. This is not standard, of course, and software must be rewritten using this method. Instructions are provided giving sample machine language and BASIC programs as examples. However, there are already a number of JOYPORT-compatible programs available from Sirius, Sierra On-Line, and Broderbund that work with this unit, which is an enclosed circuit board. It has a zero-insertion socket for use with standard paddles (there is a toggle switch for the two modes), and two Atari-type, female sockets. There is no attractive beige case; but at $34.95, it's less than half the price of its competitor. A good buy.

OCTA STICK II – ASTAR INTERNATIONAL CO. – $39.95. This unit connects an Atari eight-position joystick to your Apple. It includes one small hardware circuit board and one Atari joystick. The circuit board contains two relays which close when the paddle value is high. Thus, only three values are obtained in any axis or directions: O, 128, or 225. The centered position is pot-adjustable. The unit is suitable for Pac-Man type games and others where non-precise user positioning of a normal joystick produces errant commands. The unit emits numerous clicking sounds as the relays open and close during game play. The device works well; if you have a suitable expansion port which can handle two sets of joysticks simultaneously, you could use dual Atari joysticks for future game design.

JOYPORT — SIRIUS SOFTWARE — $74.95. Although I was unable to obtain this unit for review due to product scarcity, combined with their company policy that discourages reviews, we feel that this product should be mentioned. It apparently allows you to connect two Apple or Atari joysticks for two-player participation. There is a switch included for selection between the two modes. It appears from their ads that Sirius will explain how to implement software that is compatible with this device. The ads depict what appears to be a unit that has a functional yet attractive case. The price seems to be on the high side, since they don't supply you with any joysticks.



A EXPANDAPORT — DATAMOST
B HAND CONTROLLERS — THE KEYBOARD CO.
C JOYSTICK — GESU ENT
D TG JOYSTICK — TG PRODUCTS
E PRO PADDLES — RAINBOW COMPUTING
F OCTA STICK II — ASTAR INTERNATIONAL
G TG GAME CONTROLLERS — TG PRODUCTS
H PADDLE-ADAPPLE — SO. CALIF. RESEARCH GROUP
I SELECT-A-PORT — TG PRODUCTS
J JOYSTICK II — THE KEYBOARD CO.
K JOYSTICK — DATAMOST
L HAND CONTROLLERS — APPLE COMPUTER
M ROBO STICK — ASTAR INTERNATIONAL



N A2D2 PADDLES – A2D2 COMPANY
O A2D2 JOYSTICK – A2D2 COMPANY
P PARADISE PORTS – TECH DESIGNS
Q THE PORT AUTHORITY – OUTPUT, INC.
R KRAFT JOYSTICK – KRAFT SYSTEMS
S MICROSTIK – CJM INDUSTRIES
T MIMCO STICK – MIMCO
U TWIN PORT – OUTPUT, INC.
V ADAM AND EVE PADDLES – TECH DESIGNS
W OUTPORT – OUTPUT, INC.

TYPE 'N TALK

Company: Votrax

Department: Hardware
Sugg. Retail: $375.00

The Votrax *Type'n Talk* speech synthesizer is a second generation peripheral that adds speech capablities to any micro computer equipped with an RS-232 serial interface. Unlike earlier units, and some software packages, this unit allows an unlimited vocabulary while using virtually no computer memory. As a refinement of earlier speech synthesizers it offers much more understandable speech and the ability to use standard English word input rather than the more difficult phoneme system.

A unit such as *Type'n Talk* opens up a wealth of possiblities especially in the educational field. It has been proved that people are much more responsive to human speech than the printed word. An important point in a screen full of instructions may be ignored or missed, but a voice will immediately capture a person's attention. Young children are also more apt to pay attention to an educational package if prompting or praise is by voice.

The unit consists of a separate microprocessor and a Votrax speech chip incorporated into an attractive enclosure that closely matches the color of both the Apple and Atari computers. The Votrax contains a small amplifier that will power any small speaker. There are also controls for volume and frequency. This later control varies the tone of the machine. It can speak in a slow bass voice or a fast alto voice. In all cases it has a definite male tonal quality, close to a monotone. It sounds as one would expect a computer voice to sound.

Type'n Talk can be connected to any serial communications card in the Apple as long as it provides proper handshaking in a full RS-232-C mode. The Votrax company recommends the California Computer Systems 7710 Asynchronous Communications Card, but almost any serial interface card will work if the interface cable is properly wired. It even had no problems when I used the serial port of a Synergy card that sits in Apple's slot #0, because it is partly a 16K card. Atari users will have no problem interfacing it to the RS-232 port of the 850 Expansion Interface Module. Votrax sells cables for any of these interface combinations, and provides technical data if you choose to wire the cable yourself.

The *Type'n Talk* unit is easy to interface to the user's programs. Any string consisting of ASCII characters can be read by the Votrax. The unit has a 700 character buffer, so that nearly a minute of speech could be sent to the synesthesizer, and while it was speaking, the program could continue with its task. When the buffer is full, it sends a signal to the computer to wait before sending more characters.

The most important factor when considering a speech synthesizer is a person's ability to understand it. Probably 80 % of first time listeners can understand three-quarters of the sentences without missing a word. It usually takes several minutes of listening to gain proficiency. However, there are some people who simply cannot understand these units. These are the types of individuals who usually respond with "what?" when you speak to them. Frankly I found the Votrax unit much more understandable than the speech spoken by Street Electronic's Echo II speech-synthesizer.

Approximately 90 % of normally spelled words will be pronounced correctly by the Votrax. The difficulty lies in the complexity and spelling peculiarities of the English language. In many cases users must try a phonetic spelling to achieve understandable speech. For example, the word "today" is pronounced "tod-day" by the unit. Spelling the word "tuday" corrects the problem. Sometimes words must be broken up with spaces to achieve recognizable speech. "Computer" is a good example because it is pronounced "com-put-ter." Spacing the word on input like "com-pu-ter" works fine. The word "mouse" drove me crazy trying to find a correct phonetic spelling. It sounded like "mus" until I inputted "ma ose." The unit's documentation includes a list of words and their phoentic spellings. "Ware" is spelled "wayr" and "country" as "kuntry."

Phoneme input is also available but this entails a more involved procedure. The major advantage is greater accuracy. But it requires separating words into their phonetic parts, matching these vowel and consonant sounds in a table, converting them to the their ASCII equivalents, then sending them to the Votrax. At first glance it is very difficult, but with lots of practice it becomes tolerable.

There are a number of practical uses to which *Type'n Talk* units have been put. One company is using it to prompt users who call for information. It responds through tones from push-button phones. I experimented with the Votrax to help rent bikes and skates at a friend's shop. It was entirely menu driven for simple operation by the girl at the counter. The computer would greet the customer, then ask if they wanted to rent bikes or skates. The operator would press the S or B keys, and a sub-menu would appear on screen. Thus, the various questions or rules would be explained to the customer. For instance, the store required a $25 deposit if the rentee had an out of state driver's license. It could figure the bill and announce what was due in the course of the transaction. What was surprising was the reaction of the customers. About a third ignored the computer voice entirely. Some were surprised that computers could talk in an understandable fashion, while a small minority could not understand the machine. Many who believed that the computer could only respond in a very limited fashion were surprised when we put it in a type and talk mode where anything they typed would be spoken. Teenagers are particularly impressed when it properly delivers their favorite four letter words.

There are a number of commercial programs that use the *Type'n Talk*: all of the Scott Adams graphic adventures on the Apple interface to the unit for voice prompting. *Teacher's Pet*, an Atari program from Artworx, uses the unit. Quality Software's latest Atari version, *Tari Trek II*, a popular space game, automatically uses the Votrax if connected. Program Design uses the Votrax in its *Spelling Bee* program on the Atari, and there are a number of other educational programs that interface to the Votrax if connected. They are reviewed elsewhere in this book.

To sum up, the *Type'n Talk* offers a suitable method of producing speech in one's computer program without requiring vast amounts of computer memory. It is veratile in that it has an unlimited vocabulary, yet requires some fiddling with the input strings to produce understandable speech. In many ways, it adds a human characteristic to the computer. It is an expensive way to go, considering that in addition to the cost of the Votrax, you'll need a serial or RS-232 interface if you don't already own one. Despite the expense, it heralds a new age when voice will become an integral part of computer software.

S.A.M. (Software Automatic Mouth)
Don't Ask Software
$124.95

S.A.M., The Software Automatic Mouth, is a speech synthesizer. Unlike most speech synthesizers that are expensive and rely solely on electronics, *S.A.M* is software driven. Except for a D/A converter & amplifier board required in the Apple version due to the lack of a resident sound chip, this program produces clear sounding, inflected speech. Speech no longer has to sound as if it were produced by a dim-witted robot speaking in monotone. Instead, stress can be applied to specific syllables to produce a more human sound.

Of course, there is a penalty to pay for this speech quality, and that is the loss of 8K of user memory. While this is not a very large machine language program, larger programs that utilize both speech and graphics might not fit. This is especially true if the user opts for a straight English text-to-speech input rather than the usual phoneme-to-speech input. The English version requires an additional 6K of computer memory.

The phoneme system for speech input is the most versatile, and sounds the best. It allows stress markers to be placed on any syllable for inflection. In addition, the pitch of *S.A.M.*'s voice can be altered and *S.A.M.* can speak slow or fast. The program also understands punctuation. For example, a period inserts a pause and causes the pitch to fall, while a question mark causes the pitch to rise after a brief pause.

The phonetic alphabet consists of 48 phonemes divided into vowels and consonants. Each produces a true speech sound. When these are combined, any word can be pronounced correctly and with the proper inflection. For example, the sentence "Why should I walk to the store?" would be written as "WAY2 SHUH7D AY WAO5K TUX DHAH STOH5R." Each of the numbers represents the stress on a syllable. The number 2 indicates a very emphatic stress, while 7 drops the pitch. Six is neutral. While composing sentences looks difficult, it is easy to learn the phoneme system with practice. A dictionary of 1,500 common words is included with their phonetic spelling.

The English text-to-speech program called *Reciter* is extremely easy to use; although its speech isn't as understandable. All that one has to do is define a string called SAM$, fill the string with English words, and make a CALL to the program. Each string can be up to 255 characters long. There must be a break somewhere in the string, because *S.A.M.* can only speak for 2.5 seconds without exhibiting a slight pause in his speech. The authors claim that it can speak 90% of the words input correctly. Actually, the program, which uses 400 rules for combining letters, can speak with very few errors. Words like "computer," "today," and "machine," which gave the Votrax *Type 'n Talk* so much trouble, are no problem to *S.A.M.* However, words like "mouse," "nuclear," and "scream" are troublesome; perhaps they do not follow *S.A.M.*'s sound rules.

The program can be used very effectively to interface with educational and adventure games. Perhaps it could be used during an arcade game to warn of imminent danger. It might even prove useful if interfaced to a telephone answering machine.

All in all, *S.A.M.* is the best sounding and least expensive speech synthesizer on the market. But while it produces understandable, inflected speech, it still sounds like computer-generated language. Its sampling rate of 7000 Hz. only produces sound with a high frequency of 3500 Hz. Still, it is a breakthrough, and a fine piece of software that is extremely easy to use.

The MICROMODEM and the APPLE-CAT

You're probably wondering what a hardware review is doing in a software book! Well, as in the case of most competing peripherals for the Apple, both the MICROMODEM and the APPLE-CAT possess some similarities that allow software written for one to be run on the other.

Normally, when a product has been on the market for some time and is more or less accepted as a standard, a competitor will strive to make his product "emulate" its predecessor's, so that it can take advantage of the software that came before it. Since the usefulness of hardware products is in effect limited by the available supply of software, you should consider whether or not there is a program already on the market to make that new product do what you either want it to do now or may want it to do in the future.

Unfortunately, the Apple-Cat design is not based on the same 6850 chip that is used in both the Micromodem and the Apple Communications Card; further, neither chose to emulate the same types of registers anywhere on the card, so the increasing supply of software written to run on the Micromodem will not necessarily run on the Apple-Cat. Also, since there is currently no on-board ROM; it doesn't even support normal IN#, PR#, PRINT or INPUT commands. If you plan on writing your own software for this card, you may be in for a surprise; the manual mentions only that such information is "available on request". So far, the information we have received would probably not enable the average programmer to even begin to tackle the job.

Let's take a look at this surge of interest in modems and the recent availability of many new and exciting services for the home computer hobbyist. Several years ago, Apple Computer released an Apple Communications Card which was marketed in conjunction with an acoustic coupler to make the Apple act as a dumb terminal for a variety of applications. Later, Apple released a couple of packages to let users access the Dow Jones stock quotation services. Around that same time, a variety of computerized bulletin board systems (CBBS) were springing up all over the country. With the release of the Hayes Micromodem II and its auto-answer feature, it was discovered that similar programs could be written to run on the Apple. Companies such as the Source and CompuServe began to package services that previously had been available only to larger corporate users but were now priced and marketed for the individual. With auto-dial features, programmers could now write programs that could free users from the nuisance of dialing or even logging onto the various systems they wished to use.

Sometime this past year, rumors began to circulate about a new, more powerful modem for the Apple that would run at 1200 baud! Imagine all the time and, therefore, money that could be saved! But wait — why didn't this new 1200-baud modem work with a time-sharing service? The larger time-sharing systems in this country are generally hooked up to one of two major competing digital networks — either Telenet or Tymnet. Corporations, universities and government agencies contract with these networks to provide local access to their large main-frame computers. When calling the Source, for example, you are calling either through a local Telenet or Tymnet number, where your call is multiplexed with those of a lot of other users communicating with many other systems around the country; consequently, since your messages are able to share cross-country lines with those of other users, the cost is generally much lower than if you were to monopolize a single voice-grade, long-distance line.

Both networks support the Bell 103 standard (110/300 baud) as well as the Bell 212 or Vadic standards (1200 Baud) from many locations. However, neither network supports the Bell 202 standard — the 1200 baud standard Novation selected for the Apple-Cat! Since no one can type at 1200 baud (approximately 1200 words per minute), we would probably find this higher baud rate most useful when calling another intelligent system, which could then spit out its information at a much faster rate! The Apple-Cat comes with software to let it transfer files to/from another Apple-Cat at the 1200 baud rate, but it doesn't support a terminal mode at that speed, Therefore, even if you found a Bell 202 compatible time-sharing system, it would probably not do what you wanted it to do.

Some speculation has been raised as to whether the digital networks would modify their hardware to accommodate a large number of 202 users. The question is really one of relative size. If there was a possibility of increased revenue for these services, they might consider accommodating an additional type of modem. However, I would suspect it would take far more volume than would be generated by all Apple users of time-sharing services, since they are used to working with a much broader base of customers.

The following chart will provide you with a comparison of the current features of the Micromodem and the Apple-Cat. The features in the Apple-Cat column labeled as "not currently available" will probably be incorporated in the modem in the near future, most probably at an additional expense.

In summary, both modems will currently give you the same basic function — the ability to call various time-sharing services, bulletin boards, ad infinitum, at 110/300 baud. The Apple-Cat supports Touch-Tone dialing which can be useful with Sprint, Execunet, City Call, and various banking and billpaying services that require Touch-Tone. The Micromodem's pulse-dialing feature will work from almost anywhere, since almost all phone lines accommodate both. The Apple-Cat's 1200-baud feature is of little value except between itself and another Apple-Cat. The Apple-Cat's use of a new design that is not downward-compatible (and therefore cannot accommodate software already on the market) may be a real problem until such time when there is a ready supply of software to do those things that you require (or desire) or until further programming information is available to enable you to write your own programs. At the present time, my money is still on the Micromodem — hopefully, soon I will have a chance to evaluate features described but not currently available, at which time I may have more reason to adopt a more positive view.

	MICROMODEM II	APPLE-CAT II
Features		
Direct-connect	Yes	Yes
FCC approved	Yes	Yes
Auto-answer	Yes	Yes
Auto-dial	Yes (pulse)	Yes (pulse/Touch-Tone
Parts	Single board plus Microcoupler	Single board plus optional Expansion Module
Off-hook indicator	Pilot light	Only via software
Firmware	Onboard ROM	Optional at extra cost; not currently available
Supports IN#/PR#	Yes	With optional ROM; not currently available
Supports INPUT/PRINT	Yes	With optional ROM; not currently available
Deaf TDD compatible	No	With optional firmware; not currently available
Bell 103 compatible	Yes	Yes
Bell 202 compatible	No	Data transfer only; terminal mode not supported in current software
Bell 212 compatible (1200 baud standard used by most major timesharing services)	No	With optional accessories at undisclosed price; not currently available
Software Support	Variety of programs already available from a number of different vendors.	Only one program currently on market and it requires CPM (Z80 card)
Programming Support	Comes with manual, programming instructions, and diskette, with LISTable programs showing sample applications	Comes with undocumented object code driver on diskette and comments in manual. Information is provided on how to progam the APPLE-CAT II. A description of this material is available "on request." Information provided so far does not show how to dial, send or receive data from within your own programs.
Manufacturer:	Hayes Microcomputer Products, Inc.	Novation Inc.
List price:	$ 379.00	$ 389.00

PRINTERS FOR YOUR APPLE

After you have purchased your Apple, filled it up to 48K of memory, added your first, and probably your second disk drive, the next logical step is to add a printer.

Since the Apple can be "hooked up" to almost any printer, the potential purchaser is presented with a very wide variety from which to choose. In view of that, *The Book* has chosen some of the more popular printers, presenting below a brief chart of their various characteristics to assist you in your deliberations.

We hasten to point out that this is a very small sample of the number of printers available. However, in terms of price/performance, they are among the best.

The chart only refers to dot matrix printers; i.e., the characters are formed by a series of dots—normally the higher the matrix, the better the appearance.

CPS = Characters per second
CPI = Characters per inch
Paper Feed = T(Tractor), F(Friction), P(Pin Feed)

DOT MATRIX PRINTERS

SPECIFICATIONS	IDS 460G PAPER TIGER	EPSON MX-80/ MX-80FT	EPSON MX-100	ANADEX DP 9620A	TI 810	CENTRONICS 737
SPEED [CPS]	160	80	100	80/132	160	80/50
BI-DIRECTIONAL	YES	YES	YES	YES	YES	NO
MATRIX TYPE	9x9	9x9	9x9	9x9	5x7	7x8
GRAPHICS	YES	YES	YES	YES	NO	NO
ADJUST LPI	6,8	6	6	6,8	6,8	6
8.5 CPI	YES	YES	YES	YES	NO	NO
10 CPI	YES	YES	YES	YES	YES	YES
13.5 CPI	YES	YES	YES	YES	NO	NO
16.5 CPI	YES	YES	YES	YES	YES	YES
LOWER CASE DESCENDERS?	YES	YES	YES	YES	NO	YES
FEED	T	T/F,T	F,T	T	T	F,P
[1-10] SERVICABILITY	5	7	7	7	10	6
[1-10] PRICE PER-FORMANCE RATIO	8	10	10	8	7	6
APPROX. RETAIL PRICE	$1295	$645/$745	$995	$1100	$1905	$995

WHOLE CHARACTER PRINTERS

	NEC Spin-writer 3500/7700	Diablo 630	QUME Sprint 7	Brother HR-1	Smith Corona TP-1	C.ITOH Starwriter F-10
SPEED (CPS)	35/55	32-40	45/55	16-20	12	40/55
PAPER WIDTH	16"	16"	13"	16.5"	13"	16"
GRAPHICS	NO	YES	YES	YES	NO	YES
COST	$1995/ $2535	$2400	$2490/ $2625	$1100	$895	$2000

A whole character printer is one whose characters are formed much like a typewriter. The characters are usually on a revolving daisy wheel, spun at high speed, and struck with a hammer in their appropriate places on the page. The paper for each of the line printers is tractor (pins) and friction feed, except for the *Brother* and *Smith Corona* units, which are friction feed only. The resulting text has a printed look, or typewriter quality finish.

MXPLUS
Dresselhous Computer Products
$49.95

MXPLUS is a small circuit board that plugs into your Epson Printer. It allows you to set the print mode directly on the printer using the three select buttons, rather than with complex Control codes in your program. In addition, it has automatic perforation skipover, a feature that the original Epson printer and Graftrax chip didn't have.

You install the chip "piggyback" over the ROM 1B socket. The *MXPLUS* board plugs into the chip's empty socket, and that chip plugs into the *MXPLUS* board. Two leads from the board are clipped to pins on the 1B and 1C chips. The exact locations are illustrated in the instructions, and the entire procedure takes less than ten minutes. The greatest portion of that time is spent taking off the printer's cover.

Eight print modes can be selected individually or in combination. They include condensed, double width, emphasized, double strike, italics (Graftrax only), 8 lines/inch, indent, and perforation skip-over. First activate the MPC by holding down the "on-line" button until it beeps. Each function is assigned a number of beeps. For example, emphasized print requires four beeps; that's three additional beeps added to the first. At that point, the function can be turned on or off with the FF button. The "on-line" lamp blinks a pattern that indicates whether a function is on or off. A long "on" with a short "off" indicates the function is turned on, while the reverse is true if the function is off. You exit the MPC mode by pressing the LF button. The "on-line" button is tapped again to put the printer back on-line.

This little accessory comes in handy when you are using various commercial packages. For instance, you may be using *Visicalc* and find that you forgot to first put your printer into the 132 column (condensed) mode in order to print the entire spreadsheet. You can make the change without affecting the software. It is also very convenient when using various word processors and you want to select emphasized/double-strike for a high quality final draft. And you can use the indent feature for program listings, so that you will have room in the left margin for the three hole punch.

In sum, it is an excellent and useful product, compatible with all Epson MX-80/100 printers, with or without Graftrax/Graftrax + chips. While the Graftrax + chip now includes skip-over perforations, the *MXPLUS* offers the convenience of setting print modes with out learning complicated Control codes.

SYNERGY-CARD

Department: Hardware
Company: Spies Laboratory
Sugg. Retail: $195
Language: Synergy Card with 16K RAM

Option #1 — Adds Parallel Printer Port, Serial Port, Two Interval Timers and Software $59.00
Option #2 — Adds Clock/Calendar $49.00
Option #3 — Adds BSR X-10 Ultrasonic Interface $39.00

The SYNERGY-CARD is one of a new generation of peripheral cards that combines the functions of many different features on a single board in a single slot. Its advantage is that it frees slots in an already crowded Apple and uses substantially less power than the cards that it replaces. This card combines the functions of a 16K RAM card, a clock card, serial and parallel ports, two interval timers, and a BSR X-10 Ultrasonic Interface. While this may include more functions than most people need, it can be purchased as a 16K RAM card with the options desired.

The SYNERGY-CARD, regardless of options, functions normally as a 16K card. It obviously replaces either an Applesoft or Integer firmware type and expands the Apple's memory from 48K to 64K. It is completely compatible with Pascal, 56K CP/M, FORTRAN, and PILOT languages. It also supports the extra memory usage of programs like "Visicalc" and "Lisa". One can also use memory management systems to load normal DOS on the card so that an extra 10.5K of memory can be accessed sequentially in normal memory. Additionally, both languages are made available by using the normal INT & FP commands without loading the alternate language in the 16K card for those who have firmware cards installed in Slot #4.

The first option available for the basic 16K card adds two interval timers, a serial port, and a parallel printer port. This is possible because of an electronic chip called VIA, or the Versatile Interface Adapter. Timer #1 on the chip can count Apple's 1.0205 MHz clock signal on a 16-bit resistor. Timer #2 keeps track of a 1,024 Hz for a time base. This can range from one microsecond to 64 seconds. Thus, either of these two timers can be programmed to produce interrupts. Essentially, one could do multi-processing, such as executing a program while simultaneously printing the output (spooling). The card includes a "dump" terminal program as a working example of interrupt programming.

The serial port can drive either a serial printer or modem. The signals available are data out, data in, and status in. The software allows one to specify the proper handshake signal for your printer. Transfer rates range from 50 to 9600 baud for printers and 50 to 300 baud for modems. In addition, full- or half-duplex operation is selectable for "dumb" terminal operation. The serial interface will work for IBM Selectrics at 134.5 baud as well as for the Qume and Diablo printers. The serial interface is accessed with a PR#9 command. While most commercial modem programs can be modified to accept this command, users may have some trouble with others.

The parallel port on the card is a powerful and economical way to hook up most printers. Although the driver software is in RAM instead of ROM and can therefore be customized, the need to do a PR#8 or a DOS command PR#1 from Synergy-modified DOS can create problems when using software requiring its own DOS. Normally, if a program uses its own operating system, it will call a slot from one to seven through an address like $C100. The printer card, however, is located in Slot #0. Spies Laboratories has provided a permanent solution for this problem with its compatibility card. This card sits in Slot #1 and its 256 bytes of RAM can be programmed for compatibility. It certainly isn't the most economical way to go at $75, but if lack of card slots is your problem, it is the answer.

The majority of users will find no problem running their printers with Synergy DOS. There are exceptions involving programs using their own operating systems. Of the assembler packages, "Lisa" has no problem; however, the family of assemblers including "Tool Kit", "Ted II+", "Big Mac", and "Cosmac" can't be patched. The most popular word processor, "Apple Pi", can be fixed by giving the address $A23D for a driver in the formatter configuration program. Although "Visicalc" can't be patched, the files can be dumped to disk and then printed by a program supplied on the Synergy DOS disk. Users of "DB Master" and some other protected pieces of business software will have trouble using the parallel port without a compatibility card.

The second option available with the card provides the use of a real-time clock. One must have option #1 with its interval timer for this to work. The time-of-day clock is based on the OKI MSM5832 integrated circuit. It uses two size AA alkaline batteries to keep the clock running when the Apple is turned off. Since the clock only draws 40 microamps, the battery is expected to last over a year. The chip keeps track of the day of the week, month and year (even leap year), and the time of the day to milliseconds. Software has been provided so that easy access is available from either machine language or BASIC.

The clock is accessed from DOS by either of two commands. The first and most powerful is IN #10. The string is returned in the form, W MO/DD/YY HH;MN;SS.XXX . W is the day of the week, YY is the last two digits of the year, and XXX is milliseconds. Since the above format does not meet the standard set by the Mountain Computer Apple Clock, a second string is returned by specifying IN#11. This string is in the form MO/DD HH;MN;SS.XXX .

The clock comes with a nice demonstration program called "Hires Clock", which provides a time display. It also demonstrates the capability of reading the clock from BASIC. There is also a DOS auto-file date feature that allows you to store the date and time when the file was created or saved to disk. The date/time fields are automatically attached to the end of the catalog name. Since this string takes 14 characters, this leaves room for a 16 character name. Incidentally, DOS is patched so that the date/time is ignored when accessing a file.

The third option available allows control of a BSR Ultrasonic Controller. This will permit the Apple to control lamps or appliances automatically via signals sent over the house's wiring. The controller is accessed through the ultrasonic port via a PR#12. The commands are sent as single ASCII characters. One can turn electronic devices on/off, dim or brighten lamps, or even schedule items such as coffee-makers by accessing the clock. The interface is not hard-wired; the ultrasonic signal is emitted via a microphone.

Quality construction is used throughout. Glass epoxy is used in the PC board, while a green solder mask prevents solder shorts and provides a more reliable card. Gold plating is used on the edge connector and the highest quality chips are used for RAM.

In summary, the SYNERGY-CARD heralds a new generation of multi-function peripheral cards. It saves slot space, power, and money. It was meant to do a lot for very little money. Unfortunately, the design causes some compatibility problems with slot number accessing of various peripherals, especially on the parallel port in conjunction with a printer. The compatibility card will solve this problem for a little more money and two slots; however, a more permanent solution (although a much more costly one) would be to install chips that could handle what is called "phantom slots" assignments.

The card's DOS is very versatile, since it is configured for almost any combination of systems. The source code is even provided for easy modification. However, there is no standard operating system on the Apple. Software vendors have created their own version for their particular needs, thus creating problems for the card. The card constitutes a very good investment for users who need a 16K card and a serial card for a modem, or even for those who want to add a clock. However, it is strongly recommended that you use or retain your own parallel printer card and thus avoid the pitfalls mentioned above.

MARK II EPSON REINKER
SAS Electronics
$30.00

The *Mark II Epson Inker* is a motorized re-inking machine that is capable of re-inking Epson MX-80 and Epson MX-100 ribbons at extremely low cost. Considering that cartridge ribbon replacements cost $15 each, this machine will pay for itself after two ribbons.

The unit consists of a cast iron chassis that positions the cartridge so that a small motor turns the feed knob. The ribbon feeds past a cylindrical, inked pad which is kept inked through capillary action from a small internal reservoir. The forty or so feet of ribbon are pulled slowly past the pad until re-inked. This normally takes at least 20 minutes, but on badly worn-out ribbons it may take over an hour. While saturating the pad may decrease re-inking times, I was reluctant to do so on the theory that over-inking the ribbon was impossible to correct without running the printer until the ink intensity was back to normal. The manufacturer doesn't recommend using the ribbon immediately after since the re-inking process tends to be slightly uneven. It normally takes several hours for the ink to become uniform. The ink itself is of rather low viscosity and can be purchased for $2.00 from the manufacturer. Each bottle lasts a very long time, so that buying regular stamp pad ink may not amount to much savings if it doesn't work as well. As to whether the machine is worth it, yes! Especially if you do a lot of printing. Otherwise, consider the unit discussed next.

MARK I EPSON REINKER
SAS Electronics
$30.00

The *Mark I Epson Reinker* is a clip on unit for re-inking Epson cartridge ribbons. It clips on to the cartridge on the far right side. A felt pad rests against the ribbon and draws its ink supply by capillary action through a wick from an ink supply beneath it. The unit is simple to install. They recommend glueing the cap to the Epson plate beneath the cartridge. The unit works well, especially when using the ribbon continuously. The problem occurs when the printer is left idle over long periods. A very dark spot appears on the ribbon and thus on your printout. This can be cured by winding the spot past the print head and into the cartridge where it will dissipate with time. For people who do little printing this may be the better way to go, as it costs only a third of the price of the motorizied unit.

The Softcard by Microsoft adds not only the power of the Z80 microprocessor to the Apple, but gives the user access to a vast amount of powerful software. The Softcard may be plugged into any vacant slot except slot zero. The slot that is recommended is slot four. The minimum requirements are a system with 48K of memory and at least one disk drive. If you own a language card, the available memory on the language card can be used to provide a system with 56K of memory. The CP/M version that is provided with the card is Version 2.2. This is the latest one available from Digital Research Inc. The Softcard is initially disabled when the Apple is turned on. To turn on the Softcard, all one has to do is boot a CP/M disk, and the CP/M boot on the first two tracks of the disk will turn the card on. There is an LED mounted on the card to indicate if the card is on and has replaced the 6502 microprocessor on the mother board. If the user wishes to switch back to the original 6502 Apple, the Apple must be turned off and back on again, or a program called BOOT may be run which disables the Softcard and will pause until the Return key is typed.

There are two disks supplied with the Softcard. One is a 16-sector and the other is a 13-sector. This allows the Apple owner that has not upgraded the Apple to DOS 3.3 the ability to use the Softcard. If you have not upgraded your system, you may decide that now is the time.

The disk storage capabilities of your Apple will be limited if you have not upgraded. The CP/M program is an operating system for the 8080 and Z80 microprocessors. It has built-in commands similar to DOS. The only difference is in the syntax used. For example, to list the contents of the disk, you would type DIR, which stands for "directory". To delete a file from the disk, the command is ERA for "erase": To rename a file the command is REN. As you have probably noticed, most commands consist of only three letters. For those of us who are not typists, this is a blessing. Besides the standard use of these three commands, you may include a wildcard character for multiple matches. For example, if you wanted to list all files on the disk that started with the letter A, the command might look like:

DIR A*.*

DIR *.ASM would list all the files that had an extension of .ASM.

DIR would list all files on the disk.

The ERA command is similar to the DIR command in that it allows the use of wildcards.

ERA TREK.BAS would erase the file TREK.BAS.

ERA *.* would erase all files on the disk. The system asks the question ALL(Y/N)? to confirm this action.

ERA *.BAS would erase all the files that have an extension of .BAS.

The RENAME command is used to change the name of a file on a disk. For example:

REN A.B = C.D would change the name of the file C.D. to A.B.

Besides the three built-in commands described above, there are three more built-in commands called SAVE, TYPE and USER. The SAVE command will save the contents of memory to disk. The TYPE command will list an ASCII file to the console or the printer. The user who has a printer simply types CTRL-P and all output will be sent to the printer. The USER command allows files to be saved in a separate directory or a subdirectory of the main directory normally used. A subdirectory may include a user number of 0 to 15. This can be useful if more than one person is using your computer. CP/M can support up to four disk drives. The disks are referred to as A:,B:,C:,D:. After the system is booted up, disk drive A: is referred to as the logged disk. To change the logged on disk, you would type B: or C: or D:. This allows all commands from this point on to reference the new drive. This is the same as adding a ,D2 in DOS to specify drive two.

DIR B: would list the contents on drive B without changing the logged disk.

There are eight other programs on the disk to aid in working with CP/M. They are STAT, ASM, LOAD, DDT, PIP, ED, SUBMIT and DUMP. The PIP program is used to transfer a file from one disk to another. Besides the ability to transfer one file, the PIP program may transfer an entire disk or part of a disk by using the wildcard character "*". The STAT program is used to report the size of each file and the available space on each disk. The STAT program is also used to set files to a "read only" status. This is similar to locking a file with DOS. The STAT program enables the user to change device assignments. For example:

STAT LST: = CRT: would change the list device from the printer to the console so that all output normally sent to the printer can be viewed on the screen; this is useful if you do not have a printer.

The STAT program also allows the user to declare any file as a system file. This prevents the listing of the file with the DIR command.

For example:

If a directory contained the following programs STAT, DUMP, PIP, INVENTORY and you declared STAT, PIP, DUMP as system files, then by using the command DIR, the only files that would be listed would be INVENTORY. If the user specifies a file as having a system status, it can only be listed by a STAT, not a DIR command. The program may be called in the same manner as a normal program if it isn't declared as a system type. The ASM program is an 8080 assembler for use in writing assembly language routines. The LOAD program will read a file that is in hex format and create a memory image file that may be executed directly. The LOAD program is used mainly with the assembler. The DDT program is a dynamic debugging program that will allow you to look at and change memory or set break points, move memory blocks around, fill memory, and much more. The ED program is a text editor for creating assembly language routines and general program construction. Microsoft Basic programs are entered directly, just as you do when you enter Applesoft programs. The SUBMIT program allows you to build a file containing system commands and execute the file instead of retyping the system commands each time. This is a useful startup feature for the system. The DUMP program supplied with CP/M permits a binary file to be dumped to the screen or printer.

Microsoft provides some programs of their own on the disk. One of these is their Basic Interpreter. Microsoft's Basic includes most of the features found in Applesoft but with many more powerful statements, one of which is a Chain statement to call another Basic program. A Print Using statement is also provided for writing to the screen or printer using a formatted output. Microsoft's Basic includes built-in disk commands, so there are not any hidden Control-D's for disk I/O. It also includes a While/Wend statement to allow a structured approach. A built-in edit command with some very powerful options such as "find"and "replace" features and an auto-line command that generates lines numbers after each carriage return is included. Microsoft's Basic also has incorporated many statements to make use of the high-resolution graphic screen, paddles and speaker, some of which are:

BUTTON(O)	For determining if a paddle button has been pushed.
BEEP	Will generate a tone of specified pitch and duration.
HSCRN(X,Y)	For determining if a specific point on the high-resolution screen has been plotted.
VPOS(O)	This statement will return the vertical cursor position.

GR, COLOR, PLOT, VLIN, HLIN, SCRN, HGR, HCOLOR and HPLOT are also included in Microsoft's Basic.

Some statements that are not included in Microsoft's Basic are FLASH, ESC edit features, STORE, RECALL, SHLOAD, XDRAW, DRAW, SCALE and ROT. The LOMEM and HIMEM statements are not included in Microsoft Basic, but Microsoft allows an "M:" option to be added when loading the Basic interpreter from disk for specifying the highest memory to be used by the program. If your system includes an 80-column card, then there are no modifications needed, as the CP/M system will check the slots. If it locates one, then it will use it; if not, then the Standard Apple display of 40 columns is selected.

Besides the CP/M system programs on the disk, Microsoft included some excellent utilities of their own, each of which is described briefly below:

FORMAT	This program will format a disk for use as a CP/M disk.
COPY	This program will copy an entire disk or will copy only the CP/M system off the disk to another disk.
CONFIGIO	This will configure the system for different hardware and allows you to redefine some of the keys on the Apple keyboard.
RW13	This will allow you to read and write a CP/M 13-sector disk if you are using the 16-sector system.
CPM56	This will configure your system to 56K if you own a language card or one of the new 16K memory boards.
APDOS	This will allow you to transfer a text or binary file from a DOS disk to your CP/M disk.
DOWNLOAD	This will allow an Apple to transfer CP/M files from one system to another.

There is little doubt that most of us, while looking through a number of microcomputer magazines, have noticed all the excellent software available for the CP/M user. Now, the Apple owner can have the best of both worlds with the Softcard. In the few months that I have used it, I feel the Softcard at $350.00 is an excellent buy.

80 COLUMN CARDS

The normal screen display of the Apple II is 40 columns across by 24 rows deep. While this is all the space that may be needed for most applications, it is desirable to have a full 80 column display available. There are at least five boards (or cards) on the market today that will provide this 80 column display.

Each of these boards is designed to plug into one of the slots in the back of the Apple. Generally, Slot #3 is used for this purpose. CP/M (a Z-80 card) will look for a board in this slot and automatically use the 80 column display.

The boards range in price from $295 to more than $375. Each offers different features and capabilities. It is important to make certain that the software you choose is compatible with the board you select. Most of the software designed for use with the 80-column boards now specify the cards with which they work. Some of the programs allow you to configure the system for a specific board; other programs must be bought with your particular board in mind.

Omnivision, by The Computer Stop, is an upgraded version of "DoubleVision," which has been on the market for several years. The board offers a standard 7 by 9 dot matrix character set with true upper and lower case capabilities. In addition, other character sets may be used by changing the PROM. This includes a Hi-Res set, German, French, or many of the other languages presently available.

The board comes complete with cables and a switch assembly designed to allow the user to manually switch between 80 and 40 columns. The board supports all of the standard Apple BASIC commands, including inverse video.

Omnivision operates using a software patch, and, unless the board is supported by the program, it is necessary to load the software program each time the computer is turned on and 80 column use is desired. (80 column display will come up automatically if the program does support that particular card.) One advantage to this type of keyboard control is that special keyboard functions can be programmed in, if desired. The character set furnished with the board is well defined; and the vendor support offered by The Computer Stop has been excellent.

Videoterm, by Videx, can be purchased as a standalone addition to the Apple II, or with options offered such as a Keyboard Enhancer and a Function Strip. The Keyboard Enhancer offers several additional functions, such as a type ahead buffer; and the Function Strip is designed to provide additional keys for the user. If used in conjunction with the Enhancer, these keys may be programmed to generate strings of commands and/or functions.

Another option available for this card is a "softswitch." Installed in the Apple itself, it allows the user to select either the 40 column display or the 80 column display without having to change cables. The Videx board also has provisions to add special ROM chips on the board. There are ROMs available for foreign languages, and other character sets that may be useful for different applications, such as scientific notation.

The character set furnished with this board is well defined and easy to read. The full set of options makes it a very useful, although expensive addition to the Apple II.

Sup-R-Term, by M and R Enterprises, was one of the first boards of this type available. This board is booted up directly from the CP/M system level (if the Z-80 card is installed), and it is compatible with most of the programs that support 80 column display. Inverse characters are generally very difficult to read with this board; but the character set is otherwise well defined and easy on the eyes. Switching is accomplished either by software control, or by a hardware switch mounted on the rear of the Apple console.

The board employs CRTL-A to shift between upper and lower case characters (unless the Shift Key Modification has been made). But you should be aware that this can present problems when the board is being used for word processing. If any command in the word processing program uses a CTRL-A as well, the Apple will recognize the shift command and not the proper word processing command.

Smarterm, from Advanced Logic Systems, and distributed by Apple Computer, Inc., comes complete with a "softswitch" which permits the monitor to be attached to the Apple with only one cable. The selection of 80 and 40 columns is made by the use of keyboard or program commands.

Because this card is distributed by Apple itself, most of the programs sold by Apple requiring an 80 column display are compatible with it. The character set is not as good as that on some of the other cards, and several of the basic commands are not supported (see chart).

Full-View 80, by Bit 3 Computer Corporation, is the newest entry into the 80 column market. It takes advantage of this fact, and is, therefore, compatible with many of the programs already available. The character set is clear and easy to read, and most of the standard commands are supported. Unfortunately, the review copy of this product has not been in our possession long enough to run a full battery of tests.

80 COLUMN CARDS FOR THE APPLE II

CARD NAME:	Character Size:	Character Sets:	Lower Case Descenders:	Programmable Cursor:	Supports normal Cursor Commands:	Firmware/Software Operation	Shift Key Mod	Supports Basic Commands:	On/Off Control:	Reduced Screen Area:
SUPER 'R' TERM	5x8	1	YES	YES	YES	FIRM WARE	GAME I/O	ALL	SWITCH PROGRAM	YES
VIDEO TERM (VIDEX)	7x9	1 +	YES	YES	YES	FIRM WARE	N	ALL	SWITCH B	YES
OMNIVISION (DOUBLE VISION)	5x7 7x9	PROM	YES	YES	YES	SOFT WARE	YES A	ALL	SOFT WARE	NO
FULL-VIEW 80	5x7 7x9	1 +	YES	YES	YES	FIRM WARE	YES	ALL	SOFT WARE	NO
SMARTERM	5x7	1 +	YES	YES	YES	FIRM WARE	GAME I/O	ALL	PROGRAM	YES

A — WIRING SUPPLIED
B — With Firmware / Hardware addition — Software Control

VIDEO MONITORS

One of the nice things about the Apple II computer is the fact that for visual display, either black and white or color, it can be simply "hooked up" via a modulator to a television set.

However, there are a number of applications for which a television set may not be adequate:

(1) If the computer-based application requires the user to stare at the screen for more than a couple of hours at a sitting, then a monitor should be considered. The picture resolution of a typical television set is normally not sufficient to form crisp, sharply-defined characters. This lack of definition can lead to eye strain if the user has to view a screen full of text for any extended period of time.

(2) If the user wishes to use an 80 character generator board for his Apple, then a monitor is a must. The following are suggestions to consider in purchasing a monitor:

•When shopping for a monitor, the user should determine whether to use a black and white, green-phosphor or color monitor, as well as deciding on the screen size and price range.

•A black and white monitor is suitable for most 40-character text work, as well as for adequately displaying 80 characters, if such a board is used.

•Green-phosphor monitors are preferred by many people for their high quality text display and because green-phosphor is normally easier on the eye.

•Color monitors provide better high-quality color definition than a normal television set; however, they are not necessarily the best choice for text work because of color diffusion. Additionally, with one exception (see individual descriptions), they are not very suitable for 80-character boards.

The following list does not mention every monitor available, but is comprised of those monitors that are most *commonly* used with the Apple II computer.

		Suggested Retail
(1)	Sanyo 9" B/W monitor Model UM 4509 This is a sturdy compact monitor. Good display, though probably not the best for a 80-character board because of screen size.	$235
(2)	Sanyo 12" B/W monitor model DM5012CX Nice display, good 80-character resolution. Somewhat bulky.	$340
(3)	Sanyo 12" green monitor model DM5112C4 Same as above, but green-phosphor.	$360
(4)	Amdek 12" B/W monitor model 100 Nice display, convenient size and good for 80-column work.	$179
(5)	Amdek 12" green monitor model 300 Same as above, but green-phosphor.	$249
(6)	Amdek 13" color monitor model I Nice color display — text is good in normal 40-column mode, though not for 80 column work.	$449
(7)	Amdek 13" color monitor model II Superb high-resolution color graphics and also one of the few color monitors that can be used with an 80-character board.	$999
(8)	NEC 13" green monitor Highest quality for 80-character display.	$325
(9)	BMC 13" green monitor Same as above. Any difference is strictly subjective.	$325

LPS II
Company: Gibson Laboratories
Language: N/A
Hardware Requirements: Apple II/II +

Department: Hardware
Sugg. Retail: $349.00
Availability: 2
Disk or Tape: N/A

OVERALL RATING	**A+**	DOCUMENTATION	**C**	RELIABILITY	**A**
EASE OF USE	**A+**	VALUE FOR MONEY	**A**	ERROR HANDLING	**A**
VENDOR SUPPORT	**C+**	VISUAL APPEAL	**A+**		

A new hardware product has come on the market recently: a true light pen for the Apple II computer. "True" light pen?

In the past, all you were able to do with such products was write a program which looked at a light pen's output and ask the question: is anything there? You couldn't know if answering yea or nea was correct. With the *LPS II*, now you can. You also get a machine language driver that is hooked into the video signal available in the Apple at slot seven. With this driver, the actual vertical and horizontal position of the scanning dot on your TV or monitor is constantly tracked. This means that the pen can now tell you exactly where on the TV screen it is pointing, down to the individual dot on a Hi-Res screen. Not only can you tell if you are pointing at a given light dot, you can actually track the pen around the TV screen and, with appropriate Applesoft commands, draw in Real Time on the screen. That's a true light pen.

When you get the *LPS II*, simply plug the sealed electronic unit into slot seven and you are ready to go (unless you have an older Apple, in which case you have to run a wire to slot seven). Other slots may be used if the wire is run to that slot. Step two is to copy the supplied disk. Step three, boot the disk and calibrate the pen. Every Apple and associated CRT have different delay times from the sync pulse to any given point on the screen. The calibrate program allows you to set the monitor brightness and contrast as well as set the appropriate delays into the software. Once calibrated, your system is ready for use.

The pen comes with several programs on a disk. These are useful, but are not the polished drawing programs you can expect to see once the pen gains some acceptance. Acceptable results can be obtained with these programs. The best feature of them is that the programs may be listed and modified. Use them as a springboard for further developments. Study them to see how the pen driver commands are applied in real world situations.

On boot-up, the pen driver is loaded and set between DOS and its buffers. It is connected via the ampersand jump vector. Once connected, the pen driver remains until you again boot the disk and reload DOS. Even the FP or INT commands will not disconnect the driver. Lest you worry about the fact that it used the ampersand, the folks at Gibson Labs have been very clever: any jump commands resident at the vector will be read into the pen driver, and if the driver cannot parse the command, it will reset the command pointer and pass the command to any other ampersand routines you may have.

The pen driver has commands to initialize the system and track the pen on the screen. In addition, you may write text into any portion of the Hi-Res screen. The material is XORed, so you can always see what was written. Various tracking cursors and lines may be placed on the screen. There is also a command to produce special sound effects. Another command allows two pages to be shown with one "behind" the other. The pen may be used to "raise" the front screen and reveal portions of the bottom one. This is handy for instructions: place them on the bottom screen, and raise the top screen up just enough to see the information you need. Another interesting command allows you to open up frames into the Hi-Res screen. One application allows error messages to appear in the middle of a picture and then have the picture "repair itself" by moving the frame data back onto the Hi-Res screen. You may also draw on one page while displaying another. A zoom mode allows a small section of the Hi-Res screen to be displayed on the Low-Res screen for modification of individual dots.

No flaws in the operation of this device were detected. Some of the provided programs had flaws in them, but these were not advertised as perfect applications. The driver had no obvious flaws. The manual that was included with the pen purchased was a preliminary manual. A new manual has been promised, but has not yet been provided.

If you want a fun new product to experiment with, the *LPS II* is for you.

DUAL THERMOMETER SYSTEM

Company: Strawberry Tree Computers
Language: Applesoft
Hardware Requirements: 48K, Applesoft ROM, Disk Drive

Department: Education
Sugg. Retail: $260.00
Availability: 3
Disk or Tape: Disk

OVERALL RATING	B	EASE OF USE	A–	ERROR HANDLING	A–
EDUCATIONAL VALUE	B	DOCUMENTATION	A–	RELIABILITY	B
VENDOR SUPPORT	B	VISUAL APPEAL	B	VALUE FOR MONEY	B–

The DUAL THERMOMETER SYSTEM is a temperature measuring/data collection product ideally suited for meteorologists or anyone interested in recording the highs, lows, mean averages, etc. of time temperature readings. The package includes a ROM card, two temperature probes attached to 10-foot cables, and appropriate disk-based software for processing temperature readings.

Temperature loggings can be specified at pre-determined intervals and stored on disk, or optionally be output to a printer for immediate reference. An alarm feature is also included for notifying the observer of time readings ranging from 10 minutes to a single reading a year.

Support software allows up to seven Dual Thermometer cards for a total of 14 probes. Although this may seem like data acquisition overkill, additional probes might prove useful in a controlled environment requiring predetermined temperature readings; i.e., a research laboratory involved in zoological observation and experimentation. Each probe has its own dedicated display using a CRT (monitor or t.v.) attached to the Apple. Data can be represented in Celsius, Fahrenheit or Kelvin in combination with a 12- or 24-hour clock log. Extended remote readings can be taken up to 500 feet without any sacrifice in accuracy by using 18-gauge or heavier wire cable.

The ROM card, with its attached probes, can be plugged into any available slot; the software will recognize the card's location. The probes, in combination with the card firmware and disk software, will record the temperature within a specified time range for maximum and minimum values, mean and average readings, alarm intervals in combination with the probes, and other esoterica that can be creatively conjured up by the knowledgeable user.

The documentation is solid and thorough, leaving very little unexplained. Examples abound and specialized terminology is kept to a minimum.

Because of their verifiable accuracy, the attached probes are designed and inferentially intended to be used in a scientific environment, as well as in industrial areas requiring quasi-analog applications. However, they can be put to good use in the home, as the following may demonstrate. This reviewer strung a probe out of the window of his home-based computer room, while locating the other alongside the Apple, situated on the table by the window. A maximum variance of 27 Fahrenheit degrees was recorded over a 24-hour period with this set-up (47 d. low outside, 74 d. high inside), leading to the probable reason the flu bug hit this victim so hard during that span of three weeks; the end result of taking out the garbage at 10:00 p.m., then returning to the warm interior. The probes provided the causal relationship; the outside probe didn't even get wet from the rain.

Altogether, this is a uniquely interesting and well-designed package for the appropriate users, one which provided a very probing experience into meteorological data gathering and analysis for this reviewer.

RECOMMENDED READING LIST

There is probably no other individual device in your possession that has more practical potential than your Apple II Computer. However, in order to fully realize that potential, you must make the effort to learn as much as possible about it. To assist in that endeavor, we recommend the following books:

	TITLE	PUBLISHER	APPROXIMATE RETAIL
(1)	*Apple II User's Guide* As well done as any of the booklets that come with your Apple II Computer. This guide is a *must* for every owner. Buy it!	Osborne/McGraw-Hill	$15.00
(2)	*6502 Assembly Language Programming* Not a beginners book for assembly language programming, but a good second step.	Osborne/McGraw-Hill	$16.99
(3)	*Apple Pascal* A good introduction to Pascal Programming on the Apple.	McGraw-Hill	$13.95
(4)	*32 Basic Programs for the Apple II* Assumes a working knowledge of Basic. Good practice.	Dilithium Press	$17.95
(5)	*Using 6502 Assembly Language* The best introduction to 6502 Assembly Language programming available.	Datamost	$19.95
(6)	*Pascal Programming for the Apple* Good introduction.		$12.95
(7)	*Programming the 6502* A fair intermediate book on machine language programming.	Sybex	$12.95
(8)	*6502 Games Book* A very good book for practicing programming techniques after learning the fundamentals of machine language programming.	Sybex	$12.95
(9)	*Beneath Apple DOS* Not for the novice; but if you are serious about learning about the Apple disk operating system, this book is an absolute must.	Quality Software	$19.95
(10)	*Apple Machine Language* An easy yet simplistic introduction to 6502 Assembly Language Programming available.	Prentice-Hall	$12.95

(11)	*Apple Graphics & Arcade Game Design* An excellent explanation of Apple's graphics on the machine language level, and the only book to explain the design of arcade games. Lots of examples. For the advanced programmer.	The Book Co.	$19.95
(12)	*Kids & The Apple* An excellent book for getting children involved with the computer. A large number of lessons and examples. Designed for children 10 to 14.	Datamost	$19.95
(13)	*What's Where in the Apple* A comprehensive atlas to 2000 memory locations in the Apple.	Micro Ink, Inc.	$14.95
(14)	*Apple Basic for Business* For the business BASIC programmer. Many examples	Reston Publishing	$15.95
(15)	*Apple II Word Processing* An adequate book for users who would like to learn a little about word processors.	Que Corp	$19.95
(16)	*Apple Logo* Excellent introduction to the Apple Logo language for teachers.	Byte/McGraw Hill	$19.95
(17)	*Assembly Language Programming for the Apple II* Beginner's guide to assembly language. Not much depth.	Osborne	$12.95
(18)	*BASIC for the Apple II Programming & Applications* For the intermediate BASIC programmer. Numerous examples and exercises.	Prentice-Hall	$14.95

SOFTWARE HOUSES

Aardvark Software
783 N. Water Street
Milwaukee, WI 53202
(414) 289-9988

Addison/Wesley Publishing Co.
Jacob Way
Reading, MA 01867
(617) 944-3700

Advanced Logic Systems
1195 E. Arques Ave.
Sunnyvale, CA 94086
(800) 538-8177

Advanced Operating Systems
450 St. John Rd.
Michigan City, IN 46360
(219) 879-4693

Adventure International
Box 3435
Longwood, FL 32759
(305) 862-6917

AGS Software
5217 Rock Harbor Rd.
Orleans, MA 02653
(617) 255-0510

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

ARS Publications
3710 Pacific Ave. #16
Venice, CA 90291
(213) 396-9303

Astar International
5676 Francis Avenue
Chino, CA 91710
(714) 627-9887

Aurora Computer Enterprises
2423 American Ln.
Madison, WI 53704
(608) 249-5875

Automated Simulations
(see EPYX/Automated Simulations)

Avalon Hill
4517 Haeford Road
Baltimore, MD 21214
(301) 254-5300

Avant-Garde Creations
P.O. Box 30160
Eugene, OR 97403
(503) 345-3043

AZD Company
P.O. Box 6471
Greenville, SC 29606
(803) 297-0552

Beagle Brothers
4315 Sierra Vista
San Diego, CA 92103
(714) 296-6400

BEZ
4790 Irvine Blvd.
Suite 108B
Irvine, CA 92714
(714) 752-8388

Bitz Computer Corp.
8120 Penn Avenue South
Suite 548
Minneapolis, MI 55431
(612) 881-6955

BPI Systems
1600 W. 38th St. #110
Austin, TX 78731
(512) 454-2801

Broderbund Software
1938 4th St.
San Rafael, CA 94901
(415) 456-6424

Budge Company
428 Pala Ave.
Piedmont, CA 94610
(415) 658-8141

Bullseye Software
Box 4845
Incline, NV 89450
(702) 831-2992

Cameleon Software
(see Adventure International)

Cavalier Computer
1223 Camino Del Mar
Del Mar, CA 92014
(714) 755-8143

C.D.S. Corporation
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Logan, UT 84321
(801) 753-6990

CE Software
801 73rd St.
Des Moines, IA 50312
(515) 224-1995

Chang Laboratories
10228 North Stelling Rd.
Cupertino, CA 95014
(408) 725-8088

CJM Industries
P.O. Box 436
Sterling, VA 22170
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Littleton, CO 80123
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Columbus, OH 43220
(800) 848-8990

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Canyon Country, CA 91351
(805) 252-4244

Computer Advanced Ideas
1442 A Walnut Street
Suite 341
Berkeley, CA 94709
(415) 526-9100

Computer Consulting
6723 E. 66th Pl.
Tulsa, OK 74133
(918) 492-9036

Computer Data Systems
50 North Main St.
Logan, UT 84321
(801) 753-6990

Computer Stop
16919A Hawthorne Blvd.
Lawndale, CA 90260
(213) 371-4010

CompuThings
270 Broadway
Revere, MA 02151
(617) 289-8866

Compu-Trac
1221 Conroy Street
New Orleans, LA 70115
(504) 895-1474

Comshare Target Software, Inc.
1935 Cliff Valley Way, Suite 200
Atlanta, GA 30329
(404) 634-9535

Conduit
P.O. Box 388
Iowa City, IA 52244
(319) 353-5789

Context
23864 Hawthorne Blvd. Suite 101
Torrance, CA 90505
(213) 378-8277

Continental Software
11223 S. Hindry Ave.
Los Angeles, CA 90045
(213) 410-3977

Co-Op Software
830 4th Avenue
Geneva, IL 60134
(321) 232-1984

CPU Software
9710 24th Ave. S.E.
Everett, WA 98204
(206) 337-5888

Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07960
(800) 631-8112

Cross Educational Software
P.O. Box 1536
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(318) 255-8921

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(303) 832-1501

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(303) 750-9980

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Agoura, CA 91303
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Sunnyvale, CA 94086
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Dept. LP2, P.O. Box 22072
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(315) 474-3400

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San Francisco, CA 94126
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ISM
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(213) 541-3377

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(919) 933-1990

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(617) 762-9310

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(see Avalon Hill)

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Fountain Valley, CA 92708
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(312) 433-7550

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2210 Wilshire Blvd. Suite 705
Santa Monica, CA 90403
(213) 459-3177

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Los Angeles, CA 90025
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Dallas, TX 75230
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Lake Zurich, IL 60047
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(617) 497-2077

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11 Idar Court
Greenwich, CT 06830
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Reseda, CA 91335
(213) 344-6599

Rainbow Computing
Golden Plaza Shopping Center
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Northridge, CA 91324
(213) 349-5560

RDA Systems
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(915) 544-4397

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Elmwood, IL 61529

SAS Electronics
3091 North Bay Dr.
North Bend, OR 97459

S-C Software Corp.
2331 Gus Thomasson, Suite 125
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Dallas, TX 75228
(214) 324-2050

Science Research Assoc.
155 N. Wacker Drive
Chicago, IL 60606
(312) 984-7000

Scientific Software
P.O. Box 208
Wausau, WI 54401
(715 845-2066

Sensible Software
6619 Perham Drive
W. Bloomfield, MI 48033
(313) 977-3869

Sentient Software
P.O. Box 4929
Aspen, CO 81612
(303) 925-9293

Shafer Software
465 S. Mathilda Ave.
Suite 202
Sunnyvale, CA 94086
(408) 730-0179

Sierra On-Line Systems
(see On-Line Systems)

Sierra Software
563 E. Sahara Ave.
Las Vegas, NV 89104
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Silicon Valley Systems, Inc.
1625 El Camino Real
Belmont, CA 94002
(415) 593-4344

Sirius Software
2011 Arden Way #2
Sacramento, CA 95825
(916) 920-1939

Sir-Tech Software
6 Main Street
Ogdensburg, NY 13669
(315) 393-6633

Society for Visual Education, Inc.
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(312) 525-1500

Sof/Sys Inc.
4306 Upton Ave. South
Minneapolis, MN 55410

Softagon
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Morristown, NJ 07960
(201) 539-3770

Softape
10432 Burbank Blvd.
North Hollywood, CA 91602
(213) 985-5763

Software Alternatives, Inc.
4841 Monroe Street
Suite 101-B
Toledo, OH 43623
(419) 472-2122

Software Arts, Inc.
27 Mica Lane Rd.
Wellsley, MA 02181
(617) 491-2100

Software Emporium
P.O. Box 3232
Tulsa, OK 74101
(918) 662-7314

Software Publishing Co.
2021 E. Landings Dr.
Mountain View, CA 94043
(415) 962-8911

Software Resources
44 Brattle Street
Cambridge, MA 02138
(617) 497-5900

Software Solutions
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Scotts Valley, CA 95066
(408) 438-2433

Softworks, Inc.
607 Wellington Rd.
Chicago, IL 60657
(312) 327-7666

Sorcim
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(408) 942-1727

Source Telecomputing Corp.
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(703) 734-7500

Southeastern Software
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(504) 246-7937

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(805) 685-1931

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Santee, CA 92071
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(617) 484-8444

S.S.R. Corporation
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(716) 254-3200

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San Rafael, CA 94901
(415) 454-6500

Strategic Simulations
465 Fairchild, Suite 108
Mountain View, CA 94043
(415) 964-1353

Strawberry Tree Computers
949 Cascade Dr.
Sunnyvale, CA 94087
(408) 736-3083

Sublogic Communications Corp.
713 Edgebrook Dr.
Champaign, IL 61820
(217) 359-8482

Synergistic Software
830 N. Riverside Dr.
Suite 201
Renton, WA 98055
(206) 226-3216

Syntonic Software
10635 Richmond Ave.
Houston, TX 77042
(800) 331-4768

System Design Lab (SDL)
2612 Artesia Blvd. Suite B
Redondo Beach, CA 90278
(213) 374-4417

Tabuko Original Software
Tokyo, Japan

Tech Designs, Inc.
3638 Grosvenor Dr.
Ellicott City, MD 21043
(301) 291-0818

Telephone Software Connection
P.O. Box 6548
Torrance, CA 90504
(213) 516-9430

Terrapin, Inc.
380 C Green Street
Cambridge, MA 02139
(617) 492-8816

TG Products
1104 Summit Ave.
Suite 106
Plano, TX 75074
(214) 424-8568

Turnkey Software
13078 Mindanao Way
Suite 314
Marina Del Rey, CA 90291

Versa Computing, Inc.
3541 Old Conejo Rd. #104
Newbury Park, CA 91320
(805) 498-1956

Videx
897 N.W. Grant Ave.
Corvallis, OR 97330
(503) 758-0521

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2895 Zanker Rd.
San Jose, CA 95131
(408) 946-9000

Vital Informations
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Overland Park, KS 66204
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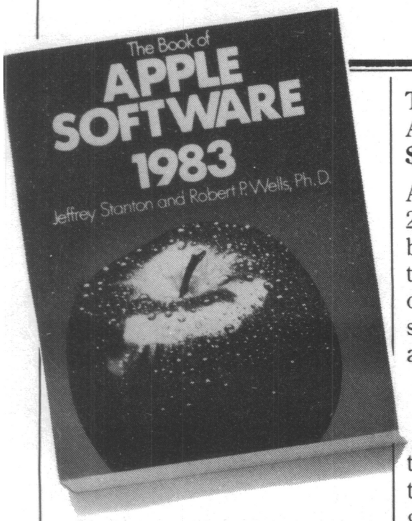

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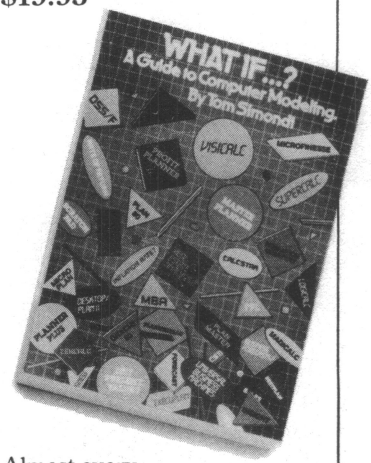

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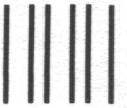

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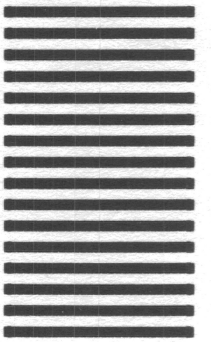

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